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ORIGINAL ARTICLES.

DEATHS FROM CHLOROFORM AND ETHER SINCE THE HYDERABAD COMMISSION. WITH CONCLUSIONS.

Read in the Section of Surgery and Anatomy, at the Forty-second Annual Meeting of the American Medical Association, held at Washington, D. C., May 5-8, 1891.

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We live in an age of wonderful progress; in nothing is this better proven than in the multiplication of new and valuable books. The works of even one year becoming almost obsolete, new editions and new works taking their place. This is also the case with original experiments and investigations, crowding out the old. Nothing is lacking in either men or money. One of the most munificent works of this kind has recently been undertaken in even far-off India; the sum of five thousand dollars having been spent by the Nizam of Hyderabad in experiments on anæsthetics alone. This large sum was given, owing to the devoted efforts of Surgeon-Major Lawrie, of the Army of India, who is a great admirer and believer in the opinions held by the late Professors Syme and Simpson, of the Edinburgh School, in regard to chloroform.

There were two Commissions, one held in 1888, in which 141 dogs were killed by chloroform inhalation, and the symptoms and results of careful post-mortems were made. The chief conclusions which were arrived at, were, "that it is impossible for chloroform vapor to kill dogs by acting primarily on the heart, and this holds good, no matter in what doses, or in what manner the poisoning is induced." These conclusions having been received with doubt by many physiologists, and more especially by the editors of the *London Lancet*, led to the Second Commission, and Dr. Lauder Brunton, a well known author and physiologist, was added to the Commission. The conclusions of the Second Commission were published January 19, 1890. About six hundred animals, chiefly dogs, were employed in the investigations.

"The experiments of the committee were designed to show the effect upon the blood-pressure, heart, and respiration of the inhalation of chloroform, ether, and the A. C. E. mixture, administered in various ways and under varying conditions. The objects of the Commission were five in number:

1. To test the suitability and safety of chloroform as an anæsthetic. The experiments with ether and the A. C. E. mixture were instituted principally for the sake of comparison with chloroform on certain points, and it is not pretended that they afford a complete exposition of the action of those agents on the system.

2. The effect of pushing the above-named anæsthetics (a) to a dangerous degree, and more especially until the respiration ceases; (b) until death results.

3. The modifications in the effects of these anæsthetics which result from (a) asphyxia in varying degrees and produced by various means, (b) from the use of drugs, such as morphine, atropine, physostigmine, and others.

4. The reality or otherwise of the alleged liability during ordinary chloroform administration to the occurrence of primary or secondary syncope or stoppage of the heart, brought about either by shock or through fatty or weak heart, or by hæmorrhage, or by changes in the position of the body. To investigate these points, in the first place a large number of operations, which are reported to be especially dangerous in reference to shock, were performed in every stage of anæsthesia, and numerous experiments were also made to show the effect of direct irritation of the vagus. Secondly, a number of animals were dosed with phosphorus before they were experimented on. This caused the weakening of the heart by fatty degeneration of its fibres, but at the same time other complicated changes in the whole of the organs of the body, not met with in the condition known as fatty heart in human beings. On the other hand, there are conditions often found in the fatty heart, such as changes of the coronary vessels, which were not produced by the phosphorus.

5. The effect of the anæsthetics above mentioned upon different animals, more especially upon monkeys, as the nearest approach to human beings."

We will not occupy your valuable time in giving the conclusions of the Commission in detail, but would refer you to the *London Lancet* and other journals which published the report. We will only state, in brief, the practical conclusions arrived at as to the effects of chloroform, "That in every instance the respiration stopped before the heart," and all that was necessary for safety was to attend to that alone. Soon after the publication of the views thus expressed, several practical English chloroformists gave their opinion, founded on professional experience, that chloroform was by no means to be considered safe by simply attending to the respiration, and that the heart still played a most important part in the deaths, as may be seen from the numerous deaths from syncope given in our tables.

With this view, I have made a most careful collection of all the deaths both from chloroform and ether, from every available source, assisted by several friends. These forty-three deaths have been arranged in a tabular form, giving the name, age, history, nature of operation, anæsthesia used, amount used, apparatus employed, posture, how long under influence, whether heart or respiration stopped first, means to resuscitate, how long continued, post-mortem, cause of death, and references.

The result of examinations and analysis of the table will be found on pages following.*

The whole number of deaths from chloroform and ether are forty-three. Of this number, thirty-nine were deaths from chloroform and four from ether. In five cases, the cause of death was syncope from chloroform, and in thirteen cases the heart stopped first. In ten cases the respiration stopped first, and in four cases the heart and respiration ceased at the same time. In one case cyanosis; no pulse. In twelve of the cases it is not stated which stopped first.

The cause of death in case 37, was due to some peculiar idiosyncrasy. In No. 22, paralysis of the pneumogastric nerve, the direct effect of the chloroform, superinduced by efforts at vomiting. After a careful consideration of the report of this case, and, as there was cyanosis after vomiting, we suspected suffocation, but this cannot be confirmed, as there was no autopsy. In case 20, there was given as cause of death, "Reflex paralysis of the heart," but there was no post-mortem to confirm this statement.

There were twenty-one post-mortems, most of them very imperfect. Nos. 24, 25, 36, and 37 were full and complete, and Nos. 15, 19, 21, 28, and 34 were fairly described in this particular. Many of the cases were very imperfect in their detail, especially those from New South Wales.

Sufficient cases are given to show the absolute importance in the method of administering chloroform, and to indicate the necessity of the most careful attention to the pulse and respiration. The only death from anæsthetics in Philadelphia, during the period stated, was one from chloroform (No. 36), while not a single death from ether in the numerous hospitals and operations—indeed we may say in the thousands of operations.

The thirty-nine deaths from chloroform added to the 375, collected by us from our work for Dr. H. C. Wood (contained in his address before the International Medical Congress, at Berlin), make, up to the present time, 414 cases—the actual number being far greater of cases never reported.

The exceeding small number of deaths from ether, demonstrates its great safety; still, that it will and does kill (and we notice that the feeble, and persons suffering from malignant disease are more apt to be its victims, see Nos. 10, 11, and 18), we would advise its use as an anæsthetic, and a full study and knowledge of the best modes of using it; which we judge is not the case in Europe.

It is true that "chloroform acts more rapidly than ether, is pleasanter to take, causes less congestion of blood in the veins, is much more portable and handy." The last two qualities render it preferable in certain classes of operations, *e. g.* in those on the eye, and in military or traveling establishments. On a campaign it would be impossible to find room to carry ether, or time to use it.

Again, ether cannot be used in hot climates or in close proximity to artificial light; nor is it suitable in certain conditions of the lungs, because ether is more apt to cause suffocation than chloroform, which is given with a much greater admixture of air. Against these advantages on the side of chloroform, ether has only one, which, however, is sufficient to outweigh them all; it is safer.

With regard to occasional unexplained deaths under chloroform, it must be remembered that they occur also under ether, though not so frequently, and used to occur in a similar way before the use of anæsthetics at all. Dr. Brunton also had several accidental deaths; but in every case, "the usual chloroformist was absent, and no one was attending to the chloroform"—a most significant statement. How often might the same be said (with a stress on the word "attending") in our hospital practice! The Hyderabad conclusions really imply a tremendous indictment against the administrators of chloroform—nothing less than that of causing death by carelessness. Unhappily, no one familiar with the administration of anæsthetics can doubt that there is some ground for this. How else account

* In preparing the "Table of the Deaths from Chloroform and Ether, since the Second Hyderabad Commission," we have received the assistance of Professor H. A. Hare, Dr. Joseph Leidy, Jr., and especially the kind labors of Dr. J. Melvin Lamb of the Library of the Surgeon-General's Office, U. S. A., at Washington. Every facility has also been afforded us by the lady Librarian of the College of Physicians of Philadelphia, and to all of these we return our thanks.

for the widely differing records of different administrators? Every surgeon knows that with good chloroformists he is perfectly confident and easy, with others the reverse. The last word has by no means been said upon this controversy; but if we may venture a prophecy, it is that the answer to the question "Is chloroform safe?" will eventually be, "That depends on who gives it."

We would refer to the experiments of Drs. H. C. Wood and H. A. Hare (*Medical News*, February 22, 1890), results which are positive proofs in opposition to the experiments and statements of the Commission, that chloroform may arrest the heart before arrest of respiration. In one experiment, breathing continued two minutes after the heart had ceased to act.

The Pulse During Chloroform Anæsthesia.—A case in point, in which chloroform so depressed the pulse, that ether had to be resorted to. The British Medical Commitee (1890) on anæsthetics,[1] after examining the kymographic tracings taken by the Hyderabad Commission, cannot agree with the Hyderabad Commission in holding that there is no danger to the heart during the administration of chloroform. Both committees have found that death occcurs by failure of respiration in the great majority of cases, and that chloroform causes a gradual fall of blood pressure, which in itself is a source of danger. Both have also observed that in addition to this gradual fall, there may be sudden and unexpected falls, with slowing of the heart; but as to the explanation of these falls, they differ. The Hyderabad Commission holds that these falls, during which life is in jeopardy, are caused by asphyxia, while the British Medical Association Committee affirm, that they are due to failure of the heart, due to a specific action of the chloroform upon the organs (from which ether is free). The general conclusion of the British Medical Association Committee is, that while recognizing the great value of the work done by the Hyderabad Commission, and more especially as aided by Dr. Lauder Brunton, they consider that the commission attach too much importance to the most common mode of death from chloroform—failure of respiration—and fail to recognize the danger to the heart that may arise in certain physiological conditions. They consider it unwise and unsafe in practice to pay no attention to the state of the circulation, and to observe respiration alone. Further they consider it unwise to convey to the public, even through the profession, the notion that there is practically no danger in the administration of chloroform."[2] In the *Manchester Medical Chronicle*, January 7, 1891, (page 276), Dr. Lawrie, President of the Hyderabad Chloroform Commission, makes the following statement in answer to Alexander Wilson, and others, in their reviews of the Hyderabad Commission, published in the *Chronicle* of February 9, 1890. Wilson concludes his review as follows: "Increased knowledge has added nothing new to the direction for its (chloroform) administration." Lawrie states, "The Hyderabad Commission was appointed to confirm or disprove Syme's and Simpson's principles, that we should be guided as to the effect of chloroform entirely by the respiration. The Commission has not only proved that these principles are sound, but has also proved that the art of administering chloroform with safety consists in keeping the breathing absolutely regular throughout the inhalation. This proof is new, and has never been established before. After criticising the teachings of Wilson, he states that the Commission has shown, 1, that the lowering of the blood pressure, which chloroform and all anæsthetics cause when efficiently administered, is in itself a harmless event, if the respiration alone be attended to and taken as a guide, and if the administration be stopped when the patient is fully anæsthetised; and 2, that the sudden falls of pressure, which the Glasgow Committee asserted, are dangerous, and attributed to chloroform, are due to stimulation of the vagus, and, by slowing the circulation, are a safeguard against overdoing.

The Commission further proved that all irregularities in the fall of the blood pressure, and in the circulation under chloroform, including such an irregularity as dilatation of the heart, which occurs when chloroform is administered properly, are due to improper administration with irregular breathing and insufficient air (page 277). Again (page 278), every medical man ought to be able to give a dose of chloroform with as much precision, as certainly as a dose of morphine, or of any other poison. The practical outcome of the disastrous teachings of the Glasgow Committee, backed up by Professors Wood and MacWilliam, is, that the relief of pain by chloroform is to be handed over to the specialists, who alone are to administer it, though their own declarations and statistics show that they cannot give it with safety. Exactly in proportion as this teaching gains ground, the profession suffers loss in credit, and in pocket, and the advantages which chloroform confers are most seriously restricted and curtailed.

The extensive experiments of the Commission have left the chloroform question in the following condition:

It was not found possible to directly paralyze the heart (of dogs) by chloroform in some 600 administrations. Death from chloroform is due apparently from paralysis of the vaso-motor and respiratory centers—probably one or both of these may be affected. When death occurs, it is the result of an overdose of the drug.

[1] See case in full: Brit. Med. Jour. Jan. 21, 1890, p. 1,425.
[2] British Medical Journal, Editorial, June, 1890.

TABULAR STATEMENT SHOWING THE "DEATHS FROM CHLORO-

Date.	No.	Name, Age and Sex.	History.	Nature of Operation.	Anæsthetic and Amount Used.	Apparatus Employed.
. . . . .	1	——— 64, M	. . . . .	Reduct'n of dislocat'n of femur	Chloroform	. . . . .
. . . . .	2	J. F., 36, M	. . . . .	Suture of patella	Chloroform. 1½ oz. .	Inhaler . . . . .
. . . . .	3	———, 72, F	. . . . .	Removal of eye.	Chloroform	. . . . .
. . . . .	4	———, 1½ yrs., M.	. . . . .	Setting of ankle in splint. . .	Chloroform	. . . . .
July 2, '89. . .	5	———, 5, M	. . . . .	Curetting tuberculous sinuses	Chloroform. 1 oz. Had taken it three times previous.	Towel . . . . .
June 19, 1889.	6	———, 2, F.	Local spina bifida; good health and robust.	To evacuate tumor	Chloroform	Towel . . . . .
Sept. 29, 1889.	7	P. B., 68, M	Stricture of urethra, etc. .	Suprapubic cystotomy	Chloroform	. . . . .
Nov. 9, 1890 .	8	M. C. Jones, 11, F.	. . . . .	Removal of mole from face. .	Chlorof. Very little .	Esmarch inhaler.
Aug. 5, 1890 .	9	———, 16, F	Tubercular disease of foot.	Upon cuboid bone.	Chloroform, 5-7 ʒ. . .	. . . . .
Jan. 10, 1891.	10	———, 44, F	Cancer.	For removal.	Ether	. . . . .
. . . . .	11	Albert Bate, 21, M.	Chronic abscess.	For removal.	Ether; had used chlor. and nitrous oxide before at times.	. . . . .
. . . . .	12	———, 41, F	. . . . .	Trachealorrhaphy.	Chloroform	Inhaler . . . . .
Feb., 1891. .	13	E. Vials, 24, F. . .	Lupus of nose. Had had 5 or 6 oper'ns under chlor.	To remove.	Chloroform	Skinner's inhaler.
. . . . .	14	———, 30, F	Good.	Removal of tumor—face . . .	Chloroform. 2-3 oz. .	. . . . .
. . . . .	15	R. Costa, soldier, 25	Good.	Incision in inguinal region. .	Chlor. About 25 gms.	Esmarch inhaler.
. . . . .	16	Mrs. R., 37, F . . .	None	Trachealorrhaphy and perineorrhaphy.	Chloroform. Had used two times before . .	Esmarch inhaler.
. . . . .	17	J., 42, F	Ovarian tumor; emaciat'd	. . . . .	Chloroform	Napkins folded in cone.
Feb. 2, 1890 .	18	E. L. P., 44, F. . .	Cancer of stomach. . . .	Reduction of pylorus. . . .	Ether. 110 c.cm. . . .	. . . . .
June 5, 1890.	19	———, 5 mos. . . .	Intestinal obstruction. . .	To explore.	Chloroform. 1½ oz. .	Towel and drop bottle.
Dec. 7, '90 (?)	20	———, 17, M. . . .	. . . . .	. . . . .	Chloroform. 6 oz. . .	Wire & lint mask.
Dec. 19, '90 (?)	21	J. C., 46, M	Contract'n of right elbow-joint, 14 mos. duration, due to burn.	. . . . .	Chloroform, oz. iiss. .	Esmarch inhaler and drop bottle.
April 29, 1890	22	Mrs. ——, F. . . .	Sensitive teeth	Extraction of tooth.	Chlor. Had used it a number of times before, once 1 oz. used.	. . . . .
Mar. 27, 1890.	23	Thomas O., 44, M.	Ulcers of leg, tetanus, lower jaw fixed; convulsive movem't of constrictors of pharynx.	. . . . .	Chloroform	. . . . .
June 18, 1890.	24	John Q., 52, M. . .	Pulm'ry phthisis, chronic nephritis, tubercular rib; abscess in pect. muscles.	. . . . .	Chlor. Had used before. Ether was contraindicated.	Inhaler . . . . .
Nov. 1, 1887 .	25	J. M.	Tumor of face of 4 months. Cirrhosis of liver; murmur over mitral area.	To explore	Chlor. Had only taken ½ doz. respirations.	Towel . . . . .
Nov. 18, 1889.	26	———, 41, M. . . .	Epithelioma of tongue; ulceration, etc. Had been a hard drinker.	The removal of epithelioma .	Chloroform, 2½ oz. . .	. . . . .
. . . . .	27	— ——, 50, M. . . .	Feeble man; curvature of spine 15 years duration; bronchitis, chronic.	Abscess of left thigh	Chlor. Had used before.	. . . . .
. . . . .	28	———, 65.	Tumor in abdomen. . . .	For above.	Chlor. Anæsthesia incomplete.	. . . . .
Mar. 26, 1890.	29	———, 56, M. . . .	Fracture of thigh.	Mending above	Chloroform	. . . . .
Mar. 29, 1890.	30	S. G., 28, M, . . .	. . . . .	. . . . .	Ether	. . . . .

FORM AND ETHER SINCE THE HYDERABAD COMMISSION."

Posture	How Long under Influence.	Heart or Resp. Stop First.	Means to Resuscitate.	How Long Continued.	Post-Mortem.	Cause of Death.	Reference.
. . . . .	. . . . .	Heart. . . .	. . . . .	. . . . .	Heart thin walls	Syncope	Lancet, Lond., 1890, ii, 935.
. . . . .	. . . . .	Heart. . . .	Usual	. . . . .	Fatty heart	Syncope	Lancet, Lond., 1890, ii, 935.
. . . . .	. . . . .	Not stated . .	. . . . .	. . . . .	Fatty heart; 14 oz	Syncope	St. Bartholomew Hosp. Rep., London, 1890, xxvi (in Statistical Tables), p. 97.
. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Heart greatly dilated and hypert. Weight more than that of a 3 yr. child.	. . . . .	St. Bartholomew Hosp. Rep., London, 1890, xxvi (in Statistical Tables), p. 97.
. . . . .	1½ m. . . .	Resp	Usual. Resp. returned and ceased again.	. . . . .	. . . . .	. . . . .	Med. Rec., N. Y., 1890, xxxvii, 289.
. . . . .	10 m. not profoundly.	Resp	Usual	. . . . .	No cause of death found. Heart normal.	. . . . .	Ibid.
. . . . .	5 moments . .	"Cyanosis. No pulse."	Usual	. . . . .	None	. . . . .	N. Am. Pract., Chicago, 1891, ii, 463.
Placed on Oper. table.	. . . . .	Together. . . .	Yes	1½ hours .	None	. . . . .	Jour. Am. Med. Assn., Chicago, 1891, xvi, 232.
. . . . .	Few minutes .	Resp	Seemed to excite at end of half hour, but then failed.	1½ hours .	Anæmia of brain	. . . . .	L'Union Médicale, Aug. 5, 1890.
. . . . .	Less than min. Op. not commenced . . .	Heart. . . .	Yes	. . . . .	None	Heart failure .	Brit. M. J., Jan. 10, '91.
. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Fat. degen. generally. Heart 11 oz.	Syncope	Brit. M. J., Oct. 11, '90.
. . . . .	. . . . .	Resp	. . . . .	. . . . .	None	. . . . .	Brit. M. J., Dec. 21, '90.
. . . . .	For 8 minutes.	Resp	Usual—Sylvester's	¼ hour . .	No evidence	. . . . .	. . . . .
. . . . .	. . . . .	Resp	Usual	. . . . .	No lesion found	. . . . .	Lancet, Lond., 1890, i, 1149.
. . . . .	Few inhals . .	Heart	Usual	2 hours . .	Congestion of brain, old pleurisy, fibrous pericarditis. Fatty heart; renal congestion.	Paral. of heart	Gior. Med. d. r. esercito, etc., 1891, xxxix, 31–54.
. . . . .	2 min. . . .	Heart	. . . . .	. . . . .	No results	. . . . .	Daniels' Texas M. J., Austin, 1889–90. v, 248–251.
Dorsal decub.	Few inhals. Died 1½ min.	Heart	Usual	. . . . .	No results of value	Syncope in first stage.	Ibid.
. . . . .	1½ hours . . .	. . . . .	. . . . .	. . . . .	Nothing notable	. . . . .	Hygiea, Stockholm, 1890, 370–374.
. . . . .	. . . . .	Heart—almost together.	Usual	35 mins . .	Lungs congested; heart healthy.	Par. of resp'y & car. centers.	Brit. M. J., Lond., 1890, i, 1425.
. . . . .	20-22 minutes .	Heart	Sylvester's and usual.	½ hour . .	None	Reflex paral. of heart	Lancet, Lond., 1891, i, 339.
. . . . .	7 minutes. . .	Heart. Resp. continued 30 secs. after.	Usual	. . . . .	General congestion; heart normal; liver slight, fatty; brain œdematous.	. . . . .	Brit. M. J., Lond., 1891, i, 461.
On back. . .	60 seconds. . .	Together . . .	Usual	. . . . .	None	See note 1. . .	N. Am. J. Homœop., N. Y., 1891, 3, s., vi, 164–167.
. . . . .	Only partial chlorof.	Heart failure. Cessation of resp.	Artificial, usual, etc. Puncture of heart.	. . . . .	. . . . .	. . . . .	N. Am. Pract., Chicago, 1891, ii, 463.
. . . . .	Few minutes .	Heart	Usual	¾ hour . .	Heart, soft walls, left vent. empty, hypertrophied; pleura ahes, calcareous nodules both lungs; Peyers patches, and solitary glands enlarged; tuberculosis second right rib; sinus with apex of right lung; kidney contracted.	. . . . .	N. Am. Pract., Chicago, 1891, ii, 463.
Semi-sitting	. . . . .	Heart	Usual	. . . . .	Tumor was "spindle-cell sarcoma;" heart 22 oz.; cavities much dilated; mitral cusps thickened; arch aorta atheromatous; liver 82 oz., congested and fatty; kidneys congested and fatty.	. . . . .	Brit. Guiana M. Ann., Demerara, 1890, 103–108.
. . . . .	. . . . .	See note 2. . .	Usual	¾ hour . .	No information to help in the case.	Failure of respiration.	N. Orl. M. and S. J., 1889-90 n. s., xvii, 726.
. . . . .	Just beyond the struggling stage.	Together . . .	Artificial r. sp.	½ hour . .	Heart ill-nourished, flabby; contained fluid blood; valves healthy; liver fatty; kidney fatty; brain normal caries and ankylosis 3 and 4 lumbar vert.	. . . . .	Brit. M. J., Lond., 1890, ii, 1890.
. . . . .	See note 3.	Resp.	. . . . .	. . . . .	Malignant disease of stomach.	. . . . .	Ibid, i, 29.
. . . . .	Death took place before oper. began.	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Med. Rec., N. Y., April 19, 1890.
. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Fatty heart . .	Med. Rec., 1891.

TABULAR STATEMENT, CONTINUED.

Date.	No.	Name, Age and Sex.	History.	Nature of Operation.	Anæsthetic and Amount Used.	Apparatus Employed.
April, 1890.	31	Evans, 39, M.	Lupus	For lupus	Chloroform	
Oct. 25, 1890.	32	Gregory, 49, M	Facial neuralgia	To relieve	Chlor., 20 gtt	Handkerchief.
July 12, 1890.	33	Bird, 9, M	Rupture of eye		Chloroform	
" "	34	——. M.	Pneumothorax; had used chloroform before.	To explore	Chloroform	
Nov. 10, 1890.	35	Jno. Goulden, 7, M	Affection of knee	Amputation		
1890	36	I. L. S., 28, F	Cystic sarcoma of ovary.	Abdominal Section	Chloroform, fl3iss.	Tait's apparatus.
Jan. 26, 1890.	37	I. R., 21, M	Acute lobar pneumonia; had influenza.	For radical cure of oblique inguinal hernia.	Chlor. (Squibbs). Less than 8 c.cm.	Towel over face.
Feb. 15, 1890.	38	L. Smith, 22.			Chloroform	
April 24, 1890	39	G. Galvin, 24			Chloroform	
May 17, 1890.	40	C. Segol, 27			Chloroform	
May 19, 1890.	41	C. Gollan, 4			Chloroform	
Mar. 13, 1891.	42	A. M. W., child. F.	Leucoma of right eye.	Iridectomy	Chlor. Took it well.	
Jan. 3, 1891	43	R. Metrani, 30, F.	Injury to face	Plastic operation	Chlor. Not excessive.	Inhaler

Note 1.—Paralysis of pneumogastric nerve, the direct effect of the chloroform, superinduced by effort at vomiting.
Note 2.—Respiration failed gradually, at one time stopping, and commenced again after artificial respiration.
Note 3.—Anæsthesia not complete when operation commenced, and heart and respiration ceased.

The most conclusive statements and experiments are given in the paper of Dr. McWilliam in answer to the strictures and conclusions published by Dr. Lawrie.

In the *Medical Chronicle*,[3] January, 1891, Surgeon-Major Lawrie, in an article on the Hyderabad Chloroform Commission, makes some comments on certain results obtained by me in a recent investigation on the action of chloroform and ether published in the *British Medical Journal*, October 11, 18, and 25, 1890.

In my paper I described the frequent occurrence of dilatation of the whole heart under the influence of anæsthetic doses of chloroform. Such dilatation was not due to changes in the pulmonary circuit, or to fall of arterial pressure.

Dr. Lawrie urges that the cardiac dilatation was due to obstruction of the circulation of the lungs, or to this along with a fall in the blood pressure. He says: "The irregularities in the tracings of the Glasgow Committee, and Professor McWilliam's recent bogie of dilatation of the heart, are due to obstruction of circulation in the lungs through interference with, or irregularity of, the respiration." And later. "Obstructed circulation in the lungs, and a rapidly falling blood pressure, are more than enough to account for the dilatation of the whole heart, which occurred in his experiments, and which he wrongly attributed to the direct action of chloroform."

Nor can this hypothesis of Surgeon-Major Lawrie's be briefly and conclusively disposed of. There is an abundance of decisive evidence available. First, as regards the alleged influence of obstruction of the circulation in the lungs, in causing dilatation of the heart. In my paper, in the *British Medical Journal*, I stated the fact that such an explanation was incompetent to explain the cardiac condition, since the whole organ was dilated in my experiments. Dilatation of the right side of the heart might conceivably (if there were no evidence to the contrary) be accounted for by the pressure of pulmonary obstruction, but dilatation of the left side (*e.g.* the left auricle) could clearly not be accounted for in the same way, since pulmonary obstruction necessarily diminishes in a large measure the flow of the blood into the left auricle, and this part becomes small and collapsed. This seemed so obvious to me, that I did not discuss the matter at any great length.

I shall now state, briefly, some facts in regard to Surgeon-Major Lawrie's hypothesis of obstructed circulation in the lungs:

1. There is no proof whatever of the occurrence of pulmonary obstruction from the administration in mammals of anæsthetic doses of chloroform, sufficiently diluted with air, as was the case in my experiments, the amount of chloroform vapor in the air never exceeding four per cent.

2. On the other hand, there is decisive proof that pulmonary obstruction was not present in my experiments. Obstruction of the circulation would necessarily cause distension of the pulmonary artery as well as, and indeed earlier than, distention of the right heart. The pulmonary

[3] Medical Chronicle, Manchester, 1891, xiii, 352-355.

TABULAR STATEMENT, CONTINUED.

Posture.	How Long under Influence.	Heart or Resp. Stop First.	Means to Resuscitate.	How Long Continued.	Post-Mortem.	Cause of Death.	Reference.
.....	.....	.....	Usual	.....	No evidence	Asphyxia. ..	.....
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	Yes	.....	.....	.....	Brit. M. J., July 12, '90.
.....	.....	Together	Yes	.....	Heart healthy.....	Heart failure .	Ibid, Oct., 1890.
.....	.....	.....	.....	.....	.....	.....	Lancet, Lond., 1890, ii, 1113.
.....	20 minutes. . .	Heart failure .	Artificial resp., hypodermics, electricity, etc	.....	No organic disease of the heart recognized before death. No post-mortem.	Heart failure .	Private contribution from Dr. Jos. Leedy, Jr., University Hospital, Philadelphia.
.....	5 minutes . . .	Resp.	Everything, artificial resp.	Some time.	None noted	No assignable cause; one of those cases due to some peculiar idiosyncrasy.	Reps. Surg.-Gen. Mar. Hospital, Washington, 1889-90, xviii, 159.
.....	.....	.....	.....	.....	.....	.....	New South Wales, Albury Hospital.
.....	.....	.....	.....	.....	.....	.....	Prince Alfred, New So. Wales.
.....	.....	.....	.....	.....	.....	.....	Prince Alfred, New So. Wales.
.....	.....	.....	.....	.....	.....	.....	Prince Alfred, New So. Wales.
.....	.....	Resp.	Usual	10-15 mins.	Heart normal, empty; pleurisy both lungs; other organs healthy.	.....	Brit. M. J., Lond., 1891, i, 800.
.....	.....	Heart. Resp. ceased a few seconds after	Usual	1 hour. . .	None	Heart failure.	Indian M. Gaz., Calcutta, 1891, iii, 76.

artery would become large and tense in consequence of the increased peripheral resistance to the outflow of blood from that vessel. Then the increased tension would react upon the right heart and cause distension there also. But in my experiments there was no distension of the pulmonary artery during the administration of chloroform. The vessel did not become distended; it was soft and compressible, and the tension within it was low. It is quite certain, then, that pulmonary obstruction could not have been the cause of the dilatation, even on the right side of the heart.

3. Even if pulmonary obstruction had been present—as was not the case—such obstruction could not have produced the condition which I described, or anything similar to it.

I have on various occasions purposely brought about a condition of pulmonary obstruction by mechanical means with a view to studying the features of this condition. This I did by injecting into one of the great systemic veins some particular substance, *e. g.* lycopodium powder, which would cause embolism of the pulmonary vessels and so obstruct the circulation in the lungs. When such a substance is injected into the vein, it rapidly passes through the right heart into the pulmonary vessels, speedily causing more or less extensive and sudden obstruction of the pulmonary circulation, according to the amount and suddenness of the injection.

The effects resulting from the plugging of the minute pulmonary vessels induced in this way are very noteworthy, and illustrate clearly the consequence of obstruction of the circulation of the lungs. The pulmonary artery swells up and becomes largely distended, while at the same time the vessel feels hard and tense to the touch; the pressure within the vessel is greatly elevated. The right ventricle, and the right auricle also, partake in the condition of distension, being unable to discharge their contents in the normal fashion in face of the greatly augmented resistance in front. The lungs become pale and anæmic. Meanwhile it is important to observe that the left auricle becomes smaller and collapsed-looking, in consequence of the obstacle offered to the passage of the blood through the lungs. Strong respiratory efforts, with convulsions of the asphyxial type (accompanied by spasmodic contraction of the systemic arteries) supervene in consequence of the stoppage of the respiratory purification of the blood; the medullary centres become violently stimulated by the venous character of the blood. Death speedily follows.

It is unnecessary to enter closely into a comparison, or rather contrast, of the typical illustration of pulmonary obstruction here afforded, and the condition of cardiac dilatation which I have described as occurring under the influence of chloroform. It is obvious that obstruction of the circulation in the lungs produces changes strikingly different from those that result from the action of chloroform; and that the hypothesis of pulmonary obstruction may at once be dismissed as entirely insufficient and inapplicable, as far as explanation of the cardiac dilatation occurring under chloroform is concerned.

Seeing that it is easy to dispose of the question of pulmonary obstruction in regard to the effects of chloroform upon the heart, I shall now advert briefly to the possibility of cardiac dilatation being dependent on a rapidly falling blood pressure, as alleged by Dr. Lawrie.

This is a matter which I carefully considered

in my paper, and in regard to which I was able to state definitely that the cardiac dilatation is not due to a fall of blood pressure. This is conclusively proved by the following facts: 1. Dilatation of the heart does not by any means always run parallel to the fall of pressure which ordinarily results from the administration of chloroform. Sometimes there is a very marked fall of pressure, with little or no dilatation of the heart; while at other times, the heart begins to dilate, before the pressure begins to fall. 2 Moreover, the heart in some instances begins to dilate during the temporary rise of pressure which at times precedes the fall. 3. Further, there may be distinct dilatation of the heart without any change of pressure at all. 4. Lastly, it can easily be shown that a simple fall of pressure, equal in amount to that which ordinarily occurs under chloroform, induced by means which do not directly affect the heart —*e. g.*, section of a vaso motor nerve, hæmorrhage, etc—does not cause dilatation of the organ as chloroform does.

It is clear, then, that the dilatation of the heart brought about by chloroform cannot be due to obstruction of the circulation in the lungs, or to a fall of systemic blood pressure; it must result from a depressing influence exerted by the anæsthetic on the organ, 1, directly; or 2, through the vagus nerves.

Finally, as this depressing influence, leading to dilatation, is readily manipulated after section of both vagi, it is obvious that chloroform must act upon the heart directly. I cannot help feeling that even a comparatively slight amount of actual observation of the features and results of a simple lowering of the blood pressure and of real pulmonary obstruction, would have prevented Surgeon-Major Lawrie from putting forward and adhering to such a hypothesis as I have here discussed—a hypothesis at once insufficient, absolutely untenable, and in conflict with large and somewhat elementary facts in the physiology of the circulation.

RESTORATION AFTER CHLOROFORM ASPHYXIA.

There is no doubt that in India deaths do occur (see case No. 43) from the administration of chloroform, yet we know from the facts stated in our work, that the climate of that region, like that of our Southern States, is favorable to its use as an anæsthetic. Recently there has come to our notice, while in search for facts on the subject of prevention of deaths from chloroform, the following cases and opinions of practical surgeons, which we consider worthy of your most serious attention.

Two cases of chloroform asphyxia were reported by Surgeon-Major Bartholomew and Civil Surgeon Ahmedabad. *a*. A patient aged 31, thin and emaciated, had suffered eight years from vesical calculus. He was operated on and the stone, weighing 50 ozs., extracted, when it was observed that respiration had ceased. Ether hypodermically and the usual remedies were used without effect, and artificial respiration (Sylvester method) continued for three hours before the patient took a long breath (the heart action, though feeble, had not ceased). Six drachms of chloroform had been given.

A patient aged 18, had had 5 drachms of chloroform given prior to enucleation. After the operation the breathing was observed to have ceased, and the patient could not be roused. Artificial respiration was carried on for one hour, and on giving a galvanic shock, the patient recovered consciousness. Drs. Pechey, Phipson, Banks, Maconachie, Meyer and Collee, all of the Army of India, cited instances in their experience of prolonged chloroform asphyxia, and ultimate recovery by artificial respiration and the galvanic shock. Dr. Meyer stated, that there was a danger of inducing delirium of the heart by the prolonged use of electricity (this is the case when applied too near the heart), and thereby superadding a serious complication which might in itself prove fatal. Frequently patients did not breathe for some time after artificial respiration, because the lungs had had such a large quantity of air thrown in as to do away with the physiological reflex stimulus to the respiratory centre.

We do not in our work advise the use of hypodermics of morphine or atropine before the use of chloroform as an anæsthetic, and would call attention to this case, also, as the surgeon did not employ the galvanic shock, and did not keep up the artificial respiration long enough.

In a discussion which took place in the Paris Society of Surgery, upon a paper[4] treating of the use of hypodermics of morphine and atropine before the inhalation of chloroform, the author of the paper, M. Regnier, was led to try this method in his practice by the recommendation of M. Dastre, who reported favorable results from its use in animals, and of M. Aubert, a surgeon, who stated that narcosis and awaking were facilitated by the injection of $\frac{1}{4}$ gr. morphine muriate and $\frac{1}{85}$ gr. atropine sulphate fifteen or twenty minutes before the operation, and that inconvenient results were observed but rarely. M. Regnier used this method with a number of patients, until, unfortunately, a fatal accident occurred.

A feeble girl, aged 16, was affected with tubercular disease of the bones of the foot, and, as the lungs presented but a few râles in the apex of one side, he decided to chisel out the cuboid bone. Half an hour before the operation he gave a hypodermic injection of $\frac{1}{12}$ gr. of morphine and $\frac{1}{250}$ gr. of atropine. Anæsthesia was easily induced, and not more than from 5 to 7 fluid drachms of chloroform were required for the

[4] L'Union Médicale, August 5, 1890.

whole operation, which lasted only a few minutes. About ten minutes after the chloroform had been removed, and while the dressings were being applied, she opened her eyes without speaking, and was then carried to her ward. Three minutes later news was brought that she had ceased breathing. Upon reaching her bed he found the respirations very infrequent. They ceased suddenly as the pulse disappeared, although feeble heart-beats were still heard. The pupil then quickly dilated. Protracted artificial respiration seemed, at the end of half an hour, to excite spontaneous respiration, but this soon failed, although supplemented by ether injection and other measures. Post-mortem examination showed anæmia of the cerebral hemispheres and medulla oblongata.

Death in this case came on very slowly from chloroform intoxication. It was quite remarkable that life could be prolonged for more than twenty minutes by artificial respiration. It was claimed that the chloroform must have been eliminated slowly, and that the elimination was rendered more slow than it would otherwise have been by the influence of the morphine and atropine.

Two members of the Society reported that they had observed, in experiments on dogs, that morphine and atropine given before chloroform, produced no reflex phenomena at the beginning, but rendered much more grave such complications as appeared at the end. In some cases there was quite protracted and severe dyspnœa. In dogs thus treated, very little chloroform was needed; in men more was required. It appeared to be conceded that the method was useful in the laboratory, but not in the clinic, as the chances of intoxication were increased.

Another member who had tried the method, stated that in male patients nothing worthy of note was usually observed; while in female patients, the awaking was much more slow than with chloroform alone. He thought women were more sensitive than men to the influence of atropine. Out of five cases he had lost one patient. The operation was for nephrectomy, and lasted an hour, 15 fluid drachms of chloroform being used. After a short awakening the respiration began to fail, cyanosis appeared, and in spite of all measures, death occurred in an hour and ten minutes.

CONCLUSIONS.

1. During the protracted use of chloroform as an anæsthetic, the blood is changed in character, lowered in pressure, with weakening of the action of the heart and changes in its structure.

2. Dilatation of the heart occurs under the use of chloroform at all stages, on both sides of the heart, while the heart muscle is weakened.

3. Cardiac failure occurred before respiration in thirteen instances out of forty-three cases of death from chloroform.

4. The depressing influence of chloroform on the heart mechanism is not exerted through the vagus nerves, and section of both vagi does not obviate the weakening and dilating influence of chloroform on the heart.

5. Too many trifling operations are performed under chloroform; its use should be reserved for those cases in which ether, nitrous oxide, or cocaine will not produce the anæsthesia desired.

6. Ether deaths, as a rule, occur in patients of a certain class, usually from obstructed respiration, and occasionally the heart will stop first, as in two of the four cases in our tables.

7. Watch both pulse and respiration, both in chloroform and ether; when the breathing becomes very rapid, danger is near.

These changes are apt to follow the first act of respiration. Chloroform vapor should not be employed over 4 per cent.

RELATIONS OF METEOROLOGICAL CONDITIONS TO THE ORIGIN AND PREVALENCE OF ACUTE DISEASES.

Report of the Standing Committee to the Section on State Medicine of the American Medical Association, May, 1891.

BY N. S. DAVIS, M.D., CHAIRMAN,
OF CHICAGO.

The work originally assigned to your Committee was commenced by its chairman in 1874,[1] and it was prosecuted with more or less activity and success until 1885, since which time it has received less attention.

Reports containing important facts and the results of original investigations were made and published in the volumes of Transactions of the Association for 1875, 1877, 1879, 1881 and 1882, and in THE JOURNAL of the Association, Vol. ii, pp. 85–169.

The leading object of the Committee has been to obtain more exact and reliable knowledge concerning the causes and circumstances that originate, or increase the prevalence of, the various forms of acute disease; by procuring and preserving continuous daily records of all appreciable conditions of the atmosphere, water and soil, and coincident record of the date of the commencement of acute diseases, in localities representing different parts of the country and various climatic conditions. For details of the plan adopted and its practical working, I must refer you to the report made to the Association in 1883, and published in THE JOURNAL, Vol. ii, pp. 85–169, 1884. That report included the results of one year of observation and record of the ozone and hydrogen peroxide in ten or twelve stations, as

[1] See Trans. Amer. Med. Association, Vol. xxv, pp. 105, 106.

indicated by uniform test papers, and in Chicago a complete record of the relative amount of free and albuminoid ammonia for the same period of time, as determined by Professor J. H. Long, of the laboratory of the Northwestern University. These records, in connection with those previously made, enable us to deduce the following propositions:

1. That the indications of the presence of ozone and hydrogen peroxide in the atmosphere vary very much at short distances, being generally increased by high winds, cold dry air, and proximity to large bodies of water, and diminished by still, warm and moist air, and still more in the interior of cities, houses, and densely populated districts.

2. That an appreciable amount of both free and albuminoid ammonia is almost always present in the atmosphere, especially in cities and densely populated districts of country. The albuminoid is much more abundant than the free ammonia, and being chiefly derived from putrefactive changes in animal matter, its relative prevalence is greatest during the autumn and early winter months, and least during the spring and early summer, when it is most actively consumed by growing vegetation.

3. The observations of Prof. Long and others show that putrefactive processes in the presence of moisture favor the production of free ammonia, while with greater dryness, more albuminoid ammonia is liberated, and that both are capable of being carried by atmospheric currents several miles from their source. His experiments, as detailed in the report of 1884, also show that the free and albuminoid ammonia are directly acted upon by the ozone, and their identity destroyed by entering into new combinations or being resolved into ultimate elements.

If these propositions are correct, they point directly to the important fact that whenever we have, coincidently, an abundance of decomposable animal matter on the earth's surface, a favorable temperature, slow atmospheric currents, a minimum of moisture, and little active vegetable growth, albuminoid ammonia will appear most abundant in the atmosphere; sufficiently so, it would seem, to either become the pabulum for the rapid growth of pathogenic germs, or for the evolution of toxalbumens or ptomaines, and thus aid in explaining the rapidity of development and spread of some important epidemics.

On the other hand, when we have coincidently, either dry cold air or rapid vegetable growth with rapid atmospheric currents, and frequent fresh falling water, we have increased indications of the presence of the active oxidizers, ozone and hydrogen peroxide, with the minimum of albuminoid ammonia in the atmosphere. The influence of these combinations of atmospheric elements on the prevalence of both endemic and epidemic diseases, is pretty clearly shown by the recorded observations made in Chicago during the last ten years, particularly in reference to typhoid fever, pneumonia, and epidemic influenza or la grippe.

In speaking of atmospheric and climatic conditions at Chicago, it should be borne in mind that the city is built on nearly level ground, skirted for many miles to the east and northeast by Lake Michigan, and to the west and southwest by a still broader expanse of nearly level, rich prairie country, while the most prevalent winds are from the southwest and northeast. The winter of 1880–81 was characterized by at least the average degree of coldness and other ordinary atmospheric conditions, but was followed late in March, 1881, by an extraordinary fall of snow over a wide district of country. Melting rapidly, it caused unusual floods and thorough saturation of soil during the month of April. But for three months following May 1 there was not enough rainfall to wet the dust in the streets, and only an ordinary average during the months of August and September, while the prevailing winds were from the southwest, and unusually light or slow. This early complete saturation of the soil, followed by protracted dryness, with average summer heat and comparatively slight atmospheric currents, strongly favored the formation of an unnusually large amount of albuminoid ammonia, with only occasional traces of ozone. The records of disease and mortality show that early in June attacks of typhoid fever began to be more frequent, and the number increased rapidly through July and August, culminating in September, and then declining to the ordinary average through October and November. During the eight months from May 1 to December 31, 1881, the whole number of deaths from typhoid fever, as reported to the city Health Office, was 527; while the total number reported for the corresponding months of 1880 was 143, and for the same in 1882 was only 235. As the extraordinary prevalence of typhoid fever in 1881 diminished to nearly the average of other years in November and December, attacks of pneumonia began to increase, and culminated in a decided excess above the average in January, 1882, when 122 deaths were recorded from that disease, whereas only 48 had been recorded during the corresponding month of the preceding year. But the most important fluctuations in the prevalence of certain diseases, and coincident extraordinary atmospheric conditions, have been observed during the years 1890 and 1891.

At the annual meeting of the American Medical Association, May, 1890, I had the pleasure of reading a brief paper on the meteorological and other local conditions coincident with the prevalence of epidemic influenza in Chicago during the preceding winter. But as the figures regarding

the prevalence of diseases given in that, were limited to the older twenty-four wards, and included only the two months prior to the appearance of the epidemic and two months after its subsidence, I have taken the liberty of extending my observations regarding the further prevalence of that disease in the same city, and its relations to the prevalence of other diseases of importance. The statistics given in this paper relate to the entire city, with a population, as by the census of 1890, of 1,100,000. The diseases considered will be designated as pneumonia, other acute affections of the respiratory organs, influenza or la grippe, typhoid fever, acute diarrhœal diseases and sunstroke. The acute diarrhœal diseases will include cholera infantum, cholera morbus, diarrhœa and dysentery. The following tables have been carefully compiled from the books of the Registrar of Vital Statistics in the Health Office of Chicago, and extend over the entire years 1889, 1890, and the first quarter of 1891. Of course they refer only to deaths, and afford a basis for only a proximate estimate of the number of attacks of each disease.

MORTALITY FOR YEAR 1889.

Cause of Death.	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Pneumonia	128	111	145	126	83	57	47	44	61	93	107	168	1170
Other acute respirat'y dis.	157	96	90	91	78	59	50	38	29	68	71	109	956
Epidemic influenza. . . .	.	.	.	.	.	.	.	.	.	.	.	1	1
Typhoid fever	30	21	15	12	16	18	29	.	.	68	68	35	453
Acute diarrhœal diseases.	11	5	13	18	21	46	594	459	297	84	42	25	1675
Sunstroke (coup soliel). .	.	.	.	.	1	1	3	.	2	.	.	.	7
													4182

MORTALITY FOR YEAR 1890.

Cause of Death.	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Pneumonia	518	295	283	172	166	78	41	59	65	85	123	188	2073
Other acute respirat'y dis.	330	171	181	122	95	64	40	49	48	79	88	146	1413
Epidemic influenza. . . .	64	37	7	2	1	.	.	.	.	.	.	.	111
Typhoid fever	55	136	103	45	82	107	86	115	95	72	67	47	968
Acute diarrhœal diseases.	53	67	31	38	33	106	571	455	198	69	22	14	1767
Sunstroke	.	.	.	.	2	119	25	4	1	1	.	.	152
													6484

Mortality for 1st Quarter 1891.						
Cause of Death.	Jan.	Feb.	Mar	Total for 1st Quar. '89	Total for 1st Quar. '90	Total for 1st Quar. '91.
Pneumonia	280	233	722	384	1096	1235
Other resp. affections . . .	176	172	344	343	682	692
Epidemic influenza . . .	4	6	155		108	165
Typhoid fever	67	61	71	66	292	199
Acute diarrhœal diseases.	28	42	71	29	151	141
				822	2329	2432

The mortality from the diseases named in the foregoing tables, as shown for 1889, is very nearly the average ratio of mortality from the same diseases for a series of years. If there is any deviation, it is in a slight excess of mortality from diarrhœal diseases during the early waves of high temperature in July, accompanied by a few sunstrokes. Taking that year as the standard of average mortality, not only for the year but also for the several seasons of the year, we are enabled to see the marked deviations from that in the table for 1890 and the first quarter of 1891, both as regards the occurrence of the epidemic influenza and its apparent influence on the mortality from other diseases. Thus, while the total mortality in 1889 from pneumonia and other acute diseases of the respiratory organs was 2,106, only one-third of which occurred during the first quarter, *i. e.*, January, February and March, and only one death from the epidemic influenza, which occurred the last week of the year, the total mortality from pneumonia and other acute diseases of the respiratory organs in 1890 was 3,486, more than half of which took place during the first quarter, and for those months was double the mortality from the same diseases the preceding year. Coincidently, the influenza epidemic that had just shown itself the last week of December, 1889, rapidly culminated in January, 1890, and almost as rapidly declined through February and March, leaving a recognized direct mortality of only 111. The reappearance of this epidemic influenza during the first quarter of 1891, at first mildly, occasioning only four deaths in January and six in February, but suddenly culminating with 155 in March, was accompanied by the same extraordinary mortality from acute diseases of the respiratory organs as in 1890.

Thus the table for 1891 shows the mortality from pneumonia in January 280, February 233, and in March 722, while that from other acute diseases of the respiratory organs was for January 176, February 172, and March 344, making the total mortality from these diseases during the first quarter of 1891, 1,927—or 149 more than the unusual mortality of the same month of 1890, and 1,200 more than in 1889, representing the ordinary average. The same influenza epidemic influence was plainly seen, though less exaggerated, on the mortality from typhoid fever and diarrhœal diseases. Thus, during the first quarter of 1889, the mortality from typhoid fever was only 66, while for 1890 it was 292, and for the same months in 1891 it was 199. And from acute diarrhœal diseases during the first quarter of 1889 the mortality was 29, for the same period of 1890, 151, and for 1891, 114. After making a fair allowance for increase of population during the past two years and three months, the foregoing figures show that the same etiological conditions that gave rise to the epidemic influenza in the city of Chicago, caused at the same time the

mortality from pneumonia and other acute diseases of the respiratory organs to be more than doubled; from typhoid fever to be trebled; and from diarrhœal diseases to be increased five-fold.

Etiological Conditions.—In considering the etiological conditions preceding, accompanying, and following the epidemic of the first quarter of 1890, in the paper I read to this Section at the last annual meeting, it was shown that during the time of the epidemic, the water supplied to the inhabitants contained an unsafe amount of free and albuminoid ammonia and of microörganisms. It was also shown that during the month preceding the outbreak of the epidemic, the mean atmospheric temperature was 9° F. above that of the same month of the preceding healthy year, and that of the month during which it reached its climax, the mean temperature was 2.4° F. above that of the same month of the preceding year. It was further shown that during the epidemic and for three months preceding, the atmospheric currents had been light and from the southwest.

An examination of the meteorological conditions as shown by the records of the Signal Service Station in Chicago, develops the fact that, for three months prior to the reappearance of the epidemic in 1891, the prevailing winds were from the southwest, the mean temperature above the average of healthy seasons, with an unusually light precipitation, either in rain or snow, until after the climax of the epidemic influenza had been reached, and evidences of impurities in the water supply remained the same as the preceding year. When the epidemic had reached its climax the prevailing wind changed to the northeast, and an increased precipitation, chiefly in the form of light snow, followed. But on the evening of the 30th of March a copious rainfall occurred, accompanied by thunder and lightning, which was followed by a rapid decline of the epidemic and its associated diseases through the month of April.

It will be seen by our tables, that the epidemic influence that culminated in January, 1890, did not reach its climax until in March, 1891; and still the preceding and accompanying conditions of the atmosphere and water, the two elements common to our whole population, were nearly the same in both seasons. What influence, if any, the extraordinary waves of heat in June and July, 1890, may have had in lessening the vital resistance of the people, and thereby increasing the mortality from the influenza, pneumonia and acute respiratory affections that followed several months later, can only be a subject of conjecture. That the varying degrees of atmospheric heat as characterizing different seasons of the year, and different years, exert a very important influence on the physiological and pathological processes taking place in the living human body, there can be no reasonable doubt. That the influence of this agent is much modified by the coincident degrees of aqueous vapor or atmospheric moisture, is equally certain. And, as already stated in this and a preceding paper, the varying quantities of organic products in the forms of free and albuminoid ammonia pervading the atmosphere, and their antagonistic elements, ozone and hydrogen peroxide, constitute the additional elements to which we must turn our attention in searching for the active etiological factors in such widespread and rapidly developed epidemics as influenza and dengue. The severe and protracted depressing effect of the essential cause or causes of the recent influenza epidemics, on the functions of the cardiac, vaso motor and ganglionic systems of nerves, coincident with excessive irritant action on the respiratory and digestive organs, is very analogous to the action of some of the ptomaines or toxalbumens. And it is difficult to find any other atmospheric elements than the albuminoid, that could be capable of either conversion directly into toxalbumeus, or of becoming pabulum for the rapid propagation of pathogenic microbes.

HYGIENE IN THE RURAL DISTRICTS.

Read in the Section of State Medicine, at the Forty-second Annual Meeting of the American Medical Association, at Washington, D. C., May, 1891.

BY GEO. W. JENKINS, M.D.,
OF KILBOURN CITY, WIS.

To be able to successfully combat all the diseases which flesh is heir to, "is a consummation devoutly to be wished;" but greater is it to be able to point out the hidden and lurking causes of disease, and thereby prevent the ravages it entails upon the human family—often widespread in its effects, and equally disastrous in its results.

Ever since the Lord made "man and breathed into his nostrils the breath of life, and man became a living soul," disease and death have surrounded him at every turn, and it is a lamentable fact that man, left to himself without the direction of superior intelligence, would fall into habits of neglect of necessary cleanliness, thereby bringing disease upon himself and the community in which he resides. So we read in Holy Writ that when the Lord took the children of Israel unto Himself as His chosen people, He gave them directions which would conduce to their continuance as a nation, and their health as individuals, and was careful to show them how to observe the great laws of health. One in particular in Deuteronomy 23: 12, 13, in regard to the disposition of all fæcal matter—that it should be carried without the camp and properly disposed of in the earth. Moses was one of the first hygienists on record; and much better would it have been for the human family to-day if his commands had been followed to the letter.

Having had a large experience in the practice

of my profession in the rural districts, I have been impressed with the fact that the people that I have visited have been in a most lamentable state of ignorance of the fundamental principles of right living and hygienic conditions of their surroundings.

One great evil that constantly confronts you in the rural districts is the unwholesome water supply. Too often the water in wells is contaminated by surface water and drainage from the house and barn yards. The well is dug near the kitchen door to be of easy access to the family, and in close proximity to the woodpile, and year after year the well receives the wash water and slops from the kitchen, after first filtering through the chips and *debris* that lie about in the back yard. At first the earth serves as a filter for all impurities which the water contains, before it reaches the well. But after a time the earth becomes so charged with filth by constant filtration that it ceases to dispose of its impurities, and the waste from the kitchen reaches the water in the well in nearly the same condition it left the kitchen maid's hands from the washtub or slop basin.

A few cases to the point will illustrate more fully the truth of the above assertions. They are from a report of cases that I presented to the State Board of Health of Wisconsin.

A family of father, mother and five children, were all more or less sick with a fever induced, as I fully believed, by drinking water which was very much contaminated by drainage from the barn yard. The well was situated between the house and barn, with a gentle slope towards the well. The yard was very foul from the accumulation of the rubbish of years, and the water in the well became impregnated with the filth from this source, until it looked, tasted, and smelt badly. I ascertained from the family that when they moved upon the place the frost was in the ground, and the water, to all appearances, was pure and good. When the frost came out the water began to look and taste badly. Of this water all the family used until I was called to see the mother and daughter who were suffering with a malignant form of diphtheria, attended with great depression of all the vital powers and bloody passages from the bowels. I explained to them the probable cause of their sickness and forbade the further use of the water. They soon began to improve and made a good recovery, after using good water from another source. They continued to use the good water for a time, and then they returned to the use of the water in the contaminated well. The mother very soon came down with exactly the same symptoms as before. The family soon left this farm, and a German who owned it, having a family of eight children, moved upon it. He declared that the water was good and pure, and that the doctor did not know anything about it. After using the water for a short time, one of the children came down with diphtheria, croupal form, and died in less than a week. After this every member of the family was sick of the same disease, and five of them died in less than ten days from the date of the first attack—nor was there any other cases of diphtheria in that section of the country where it proved as fatal as to this family. Is it reasonable to suppose that the cause of that sickness lay in any other direction than that filthy well? I think not.

Again, during the summer of 1881, I noticed that all the cases of typhoid fever which occurred in a certain village, were in families who obtained their water supply from one particular well. Its water was cold and looked pure. This well stood in the centre of a little square, and in the summer months, cattle and other animals were allowed to stand around its curbing fighting insects and stamping the ground, until a hole was made sufficiently large to catch all the water that was wasted during the drawing of it by the several families. In a short time this collected water in the hole was reeking with filth from the animals, and soaked through the earth into the well. I insisted that the typhoid fever originated from the water in that well, but could not make its patrons believe it contained any impurities, until I proved it to them by actual demonstration. I then ordered the ground dug up around the well down to the rock. The well from the rock to the surface of the earth contained tubing about six inches in diameter. This tubing was firmly fixed, by filling in around it cement and stone to the surface of the earth, thus effectually cutting off all surface drainage. After having the well thoroughly cleaned no more typhoid fever originated from that well, nor has there any cases occurred in that section up to the present date. Many farmers allow their cattle in the same way about their wells, with no thought of the possibility of such results.

During the past year I was called early in December to attend a case of diphtheria, in a section of country where there had been no exposure, and found on looking for the cause that the family had been in the habit of protecting their potatoes in the cellar from the frost by covering them four or five inches deep with forest leaves. On further inquiry I ascertained that these same leaves had been left in the cellar for several years, and as there was no window or outside door, the cellar could not be ventilated. The floor above the cellar was old and poor, and the emanations from the decaying leaves could be distinctly smelled. I ordered the leaves to be removed immediately, door and windows made that the cellar might be thoroughly ventilated, and chloride of lime freely used. That made an end of diphtheria in that family.

How often is it the case when the doctor enters the cellar to ascertain the cause of sickness in any given case, that he finds it poorly ventilated, containing decaying vegetables and decomposing matter of various kinds—and in this same cellar the milk is kept from which their butter is made. As milk forms so large a part of the farmers' diet it should be pure, but most farmers never think that milk can become contaminated by being kept in an atmosphere that is full of the germs of decaying substances.

The truth of the matter is this, that notwithstanding lecture upon lecture, line upon line, and precept upon precept, is given to those whom it is calculated to benefit, little good will result therefrom, unless it is given in a way commensurate to their degree of understanding and ability to receive it.

If the people living in the rural districts of our country could be made to understand the great importance of being enlightened upon this important subject, many lives might be saved and much sickness prevented, but so far as I know, no one has ever suggested any plan by which this great branch of their education might become popular and highly instructive to them. I propose to offer a few suggestions by which that object may be obtained.

My idea to gain that desired end, is, that the physicians of two or more adjoining townships should form themselves into a Hygiene society, to meet at stated times at some farmers' house, and then and there show to all that attend those meetings, the dangers that lie hidden and unsuspected about them.

Let any one member of the Hygiene society be required to report upon some subject connected therewith at any one meeting, which may be fixed by previous announcement, and report fully upon that subject, by the use of tests and other demonstrations as the subject demands, to make it intelligible and instructive to the people.

Of course this will require labor and time of the members composing the Board, but if they can prevent disease, and save life by so doing, they will be richly repaid for all their efforts—life and health are of more value than money.

It is the every day duties that we are called upon to attend to—the little details, and to point out again and again a lurking danger to health and life; it is this faithfulness in little things that accomplishes so much that is lasting and beneficial. Say that these duties are irksome—granted. What duties of the physician are not so, from the time that he begins his professional career until it ends? What is his reward?

We receive it every day in the consciousness of having been the means of preventing disease as well as saving the lives of many; and He whose eyes never slumber will surely reward us according to the motives that have prompted us to perform them.

THE BENEFICENCE OF DISEASE.

Read in the Section of State Medicine, at the Forty-second Annual Meeting of the American Medical Association, Washington, D. C., May 5, 1891.

BY A. N. BELL, A.M., M.D.,
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The first thought which this title suggests to the unreflective mind is, that it is in conflict with the almost universally popular belief that disease is an independent, active principle or entity, the result of sin—a penalty for the transgression of some physiological or sanitary law—which is identified with the punishment of our first parents for partaking of the forbidden fruit; a belief which, logically considered, without any conception of organic structure, would imply that man, as originally constituted, was intended to occupy this world forever.

That disease was unknown in the world before the fall of Adam, is only equally true with the statement that so was all knowledge of the concerns of mankind unknown.

It is not my purpose to analyze the sacred record with regard to such special manifestations and miracles as appear to have been adapted by the Creator to the comprehension of man in his primitive state, or to call in question their design; but to consider disease as an essential condition of life, instituted for a beneficent purpose.

I have so long entertained this belief and have had such frequent opportunities of testing its practical utility, that, to my mind, it now amounts to a thorough conviction.

For illustration: About thirty-five years ago I was called to a very sick child, about eight years old, the daughter of a learned, but exceedingly sensitive clergyman. I found him in the room with the child, walking the floor and wringing his hands, and otherwise giving vent to his feelings by prayer; with frequent appeals to God to know why his dear child should be so stricken. "Oh, my God," he cried, "for what is this affliction sent—what has my darling child done that she should be called upon to suffer," and by various similar expressions greatly disturbing to the patient and agonizing to himself.

I, of course, led him from the room and remonstrated with him, and had to repeat the process several times during the few days next following; but finally succeeded in excluding him altogether, until the child had well nigh recovered and he had become composed.

Some two or three months afterward, the Reverend Father, who, I had learned, was the editor of a church magazine, called upon me and requested me to be kind enough to write out in substance what he had learned from me of the nature of disease, and allow him to publish it. I made a conditional promise, and after a few weeks, I wrote out enough to make half a dozen printed pages, and without caption or signature,

I sent it with a note: "Here is your baby, name it to suit yourself."

It appeared in his next issue under the title of "The Goodness of God Manifest in Disease."

This was in 1857. Three years subsequently I rewrote the article and made it the concluding chapter of a little book called "Knowledge of Living Things," published by Bailliere Brothers, New York, 1860.

What follows, comprises the substance of those articles, in conjunction with more knowledge of the structure of the human organism and continued reflection upon the subject.

Every organized being and every organ and tissue of every such being, even the hairs and nails, and the most minute nerves, after they are lost to view under the most powerful microscope, are now known to be composed and maintained by living cells. Each one of the cells thus incorporated is possessed of an individual life of its own, has a period of development and maturity, possesses the property of reproduction, and dies. Life presents itself in the organism as the sum of these vital unities. It is maintained by the circulation of the blood, which is also for the most part composed of living cells; and the processes of organization and function are sustained, or otherwise, according to the conditions of the blood supply and of the organ or organism to which it is distributed. So that all irregular actions, disturbances and pains which follow, are just as much in accordance with the laws which govern the existence of a single cell, as if the cell relied on its own independent action. And all the changes that take place, whether favorable or unfavorable to the continuance of life, are based upon the same fundamental laws.

The cells exist before the being which they organize, and survive it after the play of its functions has been arrested, insomuch that the life of the organism, throughout, is the resultant of the life of the cells which constitute it; their individual existence being co-ordinated to subserve a perfectly definite object. When this co-ordination is interfered with, the result is disease. The favorable or unfavorable influences determine whether the already existing parts or cells persist, increase or diminish; whether the conditions necessary to the varied play of the organic functions remain, or whether the machinery of life is arrested by the change or cessation of these conditions.

The organism, like the cells of which it is constituted and by which it is maintained, has a period of development and growth; a period of middle life, in which the functions strive to maintain an unaltered mass; and an epoch of decrease or decline, which is concluded by natural death. It is only in accordance with these conditions that life is embodied.

The world was not made for man alone. His life is linked with the plants and animals which co-exist with him, and these are the issue of long anticipations and preparations.

Not only the comfort, health and degree of civilization, but the very existence of mankind in any given locality, depends upon the state of the earth, the atmosphere of the earth, the climate of the earth, and the productions of the earth. He is placed in a system where all the changes produced in other objects occur according to a relation existing among the substances changed, and his own organization participates in all these things that surround him. He has been endowed with a degree of intelligence equal to the necessity of determining the relation of these things to his health and life, and what he ought to do for himself is as abundantly indicated by the knowledge of his organization and powers, as the uses of any machine is understood by an acquaintance with its construction.

The nature of the human organism is such that a most intricate connection is established between the organic functions, and this connection has a constant relation to the necessity of harmonizing the functions and keeping them in sympathy with each other.

The constant physical and chemical changes which accompany life depend upon the various reciprocities which are produced by the work of the different parts of the body: The assimilation of what is received, the elimination of that which is useless, and the restoration and maintenance of the organs by which these operations are effected.

We need no reasoning to convince us that an organism so curious and so wonderfully perfect in all its parts as the human body, was designed to continue as long as the material composing it and the conditions to which it is exposed will admit of, and that upon us devolves the duty of giving it that continuance.

The preservation of health is an incumbent duty. We must preserve it in its most perfect state, that in which the powers of the constitution can be most effectually exerted. All the health and strength of which we are capable were intended for use; and any unfitness for the functions of life is a partial death, by a weakening of the compensating powers of the system. The life and activity of every part is merged into such a perfect organism, that all the organs composing it are united together in a bond of mutual dependence, and the complete performance of the entire series of actions, is necessary for the healthy maintenance of any one action. All the functions are so completely bound up in each other, that none of them can be suspended without seriously disturbing or causing the cessation of all the rest. Hence if any one organ is diseased, all the other organs are embarrassed.

We are all so placed that there are very few of

the objects surrounding us which may not be serviceable or hurtful; nor is that service to be obtained or injury avoided otherwise than by an acquaintance with things external, and their relations to our existence. The more exact our knowledge of this kind is, the more we lessen the calamities and add to the comforts of life.

Our knowledge of external things wholly depends upon our sense-perceptions. To our senses we trust directly, and by their cultivation we become acquainted with the relation of external things to health, and gain the power of increasing and varying the facts upon which we rely for guidance.

When the body is in full health and strength, the mind is so far assisted thereby that it can bear a closer and longer application. Apprehension is readier, imagination livelier, the compass of thought is more capable of enlargement, perceptions can be more quickly examined and more exactly compared, and a truer judgment can be formed. We can in all things have a clearer understanding of our relation to external things, of that which is best for us and of what is most for our interest, and thence determine our actions more readily, and persist therein with greater resolution and steadiness.

It is in this way that the soundness of the body is serviceable to the mind—each needs, each helps the other.

But the lifetime of man is perfectly consistent with the temporary existence of the cells of which his body is constituted and his relation to the conditions which surround him. Under the most favorable conditions, parts of his frame that are concerned in development unceasingly accumulate the necessary particles by a process as beautiful and systematic as it is mysterious and sublime; until, ultimately, the growth peculiar to the species and the individual is attained.

At this point the preponderance which before existed in the action of the exhalants over the absorbents, ceases; and all is equality. Ere long his exhalants fall off in their wonted activity; the fluids decrease in quantity; the solids become more rigid; and all those changes supervene which characterize the decline of life.

But death may occur at any period of life, a few only ceasing to live by the effects of age alone. The duration of life varies according to numerous conditions and circumstances: The original constitution of the individual, the habits and occupations of life, locality, and various other causes, some of which, accidental or otherwise, are inappreciable before their fatal effects are encountered.

Latitude, elevation, nature of the soil, degree of cultivation, relative position in regard to mountains, forests, rivers, etc., and general aspect of the neighborhood, all modify the condition of man and prove his adaptability by such effects as serve to make him understand his relations to what is around him.

Man's relation to these things are known by their effects. And with the faculty of reason for his guide in the prosecution of his purpose, he continually risks the consequences of his free agency by fortifying himself against recognized conditions inimical to his health and life, or by boldly setting them at defiance in the irregularities of his conduct.

Disease in all its aspects is no less constant than the physical phenomena of the universe. The more attentively it is studied from the earliest records of it, to the present time, the more evident it appears that not a single one of the many diseases described in ancient or modern times has wholly disappeared, or that a single new one has been discovered. The same and all exist to day, as ever have existed, and with equal liability to assert themselves under the same conditions as their want at any period in their history.

The Divine institution of disease in relation to man's free agency and the qualities of natural phenomena suited to the whole organic world, requires that there should be more or less uncertainty and irregularity in its action. Diversity and dissimilarity are everywhere manifest, and not less so in disease and its results than in the classes, orders, genera and species of the animals and plants; individuals of the same species are not unfrequently very dissimilar.

Disease forms no exception to the Divine arrangement of natural phenomena. The beginning and end of human life are only steps in an eternal existence. Death is the completion of life, but if disease had no other purpose nor end than death, it would be an anomaly in the works of the Creator, as involving an arrangement of vitality without salutary tendencies. Like our own handiwork, which has in itself no provision for repair, we should wear out; labor and sorrow would be the end of all our days; life would be a burden, health beyond hope, and eternity a new creation.

The gratification which the reasoning faculties constantly seek, even if it involve a sacrifice of individual health, discloses truths of universal application. And as man tastes of the delights of intellectual action and gives way to the impulses of his nature to pursue them, he will see in disease a providential mercy to encourage his willing submission to it and to mitigate its severity. As its pains are but temporary, he can find strength to bear them patiently, if not to welcome them in the thought of the enduring good which they are intended to work within him.

The uncertainty of the issue in any disease, however slight in the beginning, is evidence of its merciful object. Were it otherwise, were our

bodies so constituted as never to be sick but unto death, how appalling and hopeless would be the condition of man—hardened in sin, by the deliberate postponement of immortal concerns on account of the certainty of time! But the uncertain duration of, and occasional recovery from, even the most fatal diseases, guards and secures their fitness for the common purpose, and prevents them from being any exception to the Divine arrangement.

But let us go further and suppose disease to be of one kind only, and always fatal at a particular period. Then the case would be much aggrated. A deathbed repentance would be the universal reliance, for while health continued there would be no concern for a future state. Feeling sure of time for the necessary preparation, convenience and necessity would take the place of duty, and the deceptions of weakness and bewilderment, instead of strength and clear perception in the full enjoyment of health and faculties, would determine the chances of eternity.

On the other hand, people sometimes die without the intervention of disease—are suddenly cut off in the full possession of health. But such deaths are rare and exceptions to the general rule. And how would it be if they were the rule instead of the exception? How indescribably dreadful would be the fear of certain sudden death! The whole of life would consist in the dread of impending danger; pleasure would be unexperienced and unknown, and civilization among the things that are not.

Indeed, it is only by the present arrangement of disease that its Divine origin can be appreciated and its beneficence discerned. In any other way it would have no analogy to the diversity everywhere manifest in natural phenomena, nor would it serve the merciful purpose for which it was ordained.

Disease was not instituted simply as the road to death, or it would have been uniform and certain in its course. True happiness consists in the influence of religion, to which the whole of life should be devoted.

That fulness of communion which actuates the most kindly emotions, induces peace, inspires love and waits for heaven, is more or less the fruit of disease. It brings out and nourishes all the finest feelings of human nature. When strength is laid low and man is made to see and feel his dependence upon his fellowman, who that has watched and studied the motions of the faithful physician and seen the sympathy of his full heart overflow, lest through too much confidence in human aid the purpose of God may not be fully accomplished; who has seen this and not felt the benefit of the sick room? Or, again, when the surgeon has to take the responsibility of hazarding the most intense suffering with the least bare hope of relief from impending death; with what sympathy, what self-denying devotion, the wife, the mother, the sister, the friend, aye, the enemy even, and the most abandoned of mankind, all find their feelings softened under such circumstances. But again: when disease appears in its most appalling aspect, and the heart of the Nation is stirred by the advance of a fatal epidemic on a neglectful community, to keep itself fortified against such an event, but instead, is beset round-about with the most favorable conditions for the reception and propagation of such a disease, and the life of thousands, it may be, is made to depend upon the fortitude of the practical sanitarian who is called upon to defend such a community, until it can be aroused from its sleeping indifference and made to bestir itself by the use of its reason; who that has witnessed such scenes is not ready to confess that it is in mercy and not wrath that God has sent disease into the world?

All conflict with this conclusion is removed by our Lord's blessed answer to the question, "Master, who did sin, this man or his parents, that he was born blind?"

"Neither hath this man sinned nor his parents, but that the works of God should be made manifest in him."

The apparent punishment of Azariah with leprosy for profanity, and of Gehazi for covetousness and falsehood, was in reality a correction in mercy. And in like manner were the punishments of the Israelites.

Disease is nowhere manifest as mere punishment, but as a correction in mercy for the salvation of the soul. Even when it is brought about by our own misconduct, it is consonant with this view, because we are admonished by it to be ready for death.

We are corrected against the imprudence committed for future improvement in *ourselves*, not punished that others may profit by our example, which is the true design of punishment. Moreover, as a general thing, there is no connection between acts performed and disease. Indeed, if this were the case, we should find that the righteous and the wicked could be designated by their relative degree of health, and we should be constantly led to inquire, "Who did sin, this man or his parents?"

It is conclusive that no manner of life can be alleged in justification of disease. From infancy to old age, the innocent and the guilty are alike subject to its uncertainties.

The inherent aversion of man to live for the future, needs a constant monitor.

There is no condition in which we are in so much danger of forgetting that an eternity awaits us, as when we are in the uniform enjoyment of health. The purpose of disease may indeed be disregarded, unheeded; in which case the visitation will be unprofitable, as it was to the Philistines, but its purpose is not on this account al-

tered. A thorough conviction of God's love and merciful providence in all His dispensations is the only adequate proof of a submissive spirit. And the benefit of disease is to be obtained, not by endeavoring to discover why it has been inflicted, but by meek submission to the Divine will.

It is thus that the Creator, having designed man for a higher sphere, has not only given him the capacity of knowledge and virtue, but has instituted disease as a sentinel on the threshold of his future existence.

TUBERCULOSIS AND LEPROSY IN JAPAN. A STUDY IN ETHNOLOGICAL PATHOLOGY.

BY ALBERT S. ASHMEAD, M.D.,
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For twelve centuries the Japanese world knew no change. Buddhist traditions and doctrines, imported from India, religious laws and superstitions, held absolute sway. Even so far back as the age of Jimmu Tennô (660 585 B. C.), that fabulous first Mikado, who is said to have descended from the Gods, Japan had a theocratic form of government; the sovereign was not obeyed only, but worshiped. In the sixth century A. D., in the reign of the 26th Mikado, Buddhism made its first appearance in the country. It gradually extended its domain and consolidated its position through succeeding reigns, until, at last, the Empress Suiko (593-628 A. D.), recognized and made it the religion of the state. These populations have ever since been ruled by the doctrine of Buddha, and peculiarly moulded by its spirit. The Buddhist philosophy exposes, in its sacred volumes, a sacerdotal system of medicine for the cure of the body and the soul. From those hoary pages, Japanese medicine has been evolved; but ever since the twefth century of the Christian Era, it has striven for independence, and by slow steps, reached, at last, a state of comparative freedom. For their speculation was never completely enfranchised.

All scientific teaching in Japan bears unmistakably still the religious stamp; as to statutory or civil law, it has never made even an effort to shake off the Buddhist shackles, wherewith it has been bound time out of mind.

The building up of the mental and moral type of the Nation has been the work of many centuries, and such a structure will not fall down at the trumpet-blast of one generation, nor of several generations. The laws here as elsewhere, have fitted themselves to national and individual requirements, and neither the spiritual nor the material constitution of the people can adapt itself, at least not for a long time, to the wants, feelings and aspirations of nations so profoundly different from itself, as those whom it has taken now for its models and preceptors. It will be a useful preliminary, to devote a few words to the description of this strange society.

There have ever existed, it seems, three classes or castes in Japan, a hereditary nobility, a great middle class and a despised crowd of "Pariahs" and paupers. The nobility is composed mainly of the descendants of five ancient and illustrious families, the Fujiwara founded in 645-649 A. D., the Taira founded in 782-905 A. D., the Minamots founded in 839-880 A.D., the Hojo, a branch of the Taira, and the Ashikaga, a branch of the Minamots. The first three have married and intermarried constantly, even incestuously (through concubinage at least), during many hundred years, and thus kept all the power and wealth in their possession. From these are descended the court—nobles and daimios of the realm, the remains of feudal supremacy, whose power was overthrown only at the beginning of the Meji era in 1867. The Mikado, or religious head of the Nation at that time, had abolished the Shogunate, or so called temporal power of the Tycoons, which had existed in a direct line for 264 years, having been founded by such members of the hereditary nobility as professed the greatest influence. Close breeding between families of that order has been the rule, and often, that families might not die out, it had been found necessary to recur to adoption. The same law which sanctioned adoption, sanctioned also the transmission of nobiliary rank by that process.

There are now 470 princes and nobles, and only 3,000 direct descendants of the old nobility. There has been 123 reigning Mikados, with one dynasty. In 662-667 A. D. reigned Tenji Tennô, the 38th Mikado, whose son became the head of the renowned family of Fujiwara (Wistaria field), next to that of the Mikado, the oldest family in Japan. In 898-930 A.D., in the reign of one of the "Puppet" Mikados, important and noble families arose who disputed with the Fujiwara family the control of the Mikado. In 931-946 A. D. reigned a child of the house of Taira. The great rôle of this family falls between the period of power of the Fujiwara and that of the Minamots, in the middle of the 12th century; and when that age of splendor expired, the name of the race continued to live in the five Sekké families. The earlier professors of Tsushima and various other daimio families, claimed descent from the Taira. The Minamoto (Chinese gengenji, source of the spring) becomes prominent in its turn, and gives to the country its greatest and most celebrated heroes, who claim descent from the 52nd Mikado (806-809 A. D). The office of Shogun, which was overthrown in 1867, became their exclusive property. Thus this family, through all kinds of vicissitudes, had held temporal sway during seven centuries! From the 62nd to the 74th Mikado (947-1108 A.D), the in-

fluence of the Fujiwara continues. In the time of the 83d Mikado (1188-1198 A.D.), the Taira family power was destroyed, the female members were driven into prostitution, being allowed certain privileges, which have been handed down in that class to the present day. In 1203 A.D. the Hojo family appears, and is represented in the Mikado. This house of Hojo fell in 1333 A.D. In 1338 A.D. the Minamoto are represented in the Mikado. After the fall of the Hojo, the Ashikaga appeared, and for 56 years, there were two dynasties, one ruled by the Ashikaga and the other by the Minamoto. Their wars were called the wars of the Chrysanthemums; (this flower being the symbol of the sun, is emblematical of imperial authority—Nippon, the ancient name of Japan, means origin of the sun). The great Ashikaga died in 1409 A.D., and the power and the influence of the Minamoto, having declined from the time of the 102nd Mikado, gradually died out. In the second half of the 6th century, these families again renewed their supremacy, during the times of Mobunaga (of banished Taira and peasant blood), Hideyoshi (of pure peasant blood, and Iyéyasŭ (of Minamoto and peasant blood). These three names are the greatest in Japanese history. The Shogunate of Ashikaga ended in 1573 A.D. It remained vacant until 1603 A.D., when the Tokugawa dynasty (a branch of Minamoto) was invested with it through Iyéyasŭ, and continued till 1867 A.D., when it was forever abolished by the reigning Emperor Mutsuhito (Meek man,) whose mother was of the Fujiwara family through the house of Hujo. This Mikado, the 123rd of his line, has no child of his high born wife. It has therefore become a necessity of State to declare his eldest son by one of his six concubines, a lad now twelve years old, prince and heir to the throne. This ceremony will take place in the coming spring.

The great middle class of the population of Japan comprises the bulk of its people. Hybridity has been the rule with it through various immigration, invasions, wars and the commercial relations. Quatrefages (*Bull. Soc. d'anthrop. de Paris*, 1883, vi, 654) defines the factors of the population as follows:

1. A black element, type negrito, to-day probably quite fusioned.

2. A yellow element, coming probably from China, and always easily recognizable.

3. A white Olino element, representing the population which occupied the Archipelago, at the time of the conquest.

4. A white Indonesian element, which made that conquest, and which is found sometimes in a state of purity, especially among the members of the old nobility.

He makes Indonesian and Polynesian synonymous terms, which represent the same race, claiming that the superior ethnological element, which peopled Polynesia came from the Malay Archipelago, in other words from Indonesia. This element M. Maget tells us, is found in the part of the Japanese race, that is given to the traffics habitual to coast dwellers; he thus defines the nature of that ethnical element, to which belong the fishermen of Japan, so different from all other elements in the interior.

This Indonesian element is not autochton, according to Quatrefages, but is represented by the conquerors, the tradition about Jimmu Tennô leaving no doubt in the matter. He claims that this Simili-Malay race was not a well defined race, but the result of the fusion of diverse, especially yellow and white elements, which were fusioned under the influence of Islamism. He thinks that the black element in the Japanese hybridity, is clearly negrito, and not Papuan or Polynesian negro, basing his conclusion on the study of the skull made by M. Hamy and himself (Etude sur les Mincopies, par M. DeQuatrefages, Revue d' Anthro. Les Negritos a' Fornié et dans l' Archipel. Malais, par M. Hamy, *Bull. de la Société d' Anthrop.* vii, Crania Ethnica).

Remy (*Bull. Soc. d' Anthrop. de Paris*, 1883, p. 908) observes that a blonde Japanese does not live, and he never heard of an albino. The blue iris is as rare as the blonde hairs; it had probably never been seen in the country previous to the advent of the Dutch, for the latter mention that they were called the "blue eyed Dutch." The black hue of hair, pileus and iris, is constant. This uniformity of hue, is, especially, the common tie of all the mixed hybridized races which form the population of Japan. The great majority of the people have a limited pileus development. The hair grows in abundance, but the beard, the hair of the pubis and of the arm pits, are rare, and the rest of the body is glabrous. This stopping of development of the pileus system, makes the Japanese preserve for a long time the appearance of adolesence. The same author states that there is no unique Japanese race, and that the population is a mixture of divers races.

His division of hybrid types is as follows:

1. Type with long face, eyes black, oblique and bridled, nose prominent and aquiline, hair stiff and abundant, beard rare, body glabrous. It is considered to be that of beauty and distinction, and is especially found among the nobility. Women who possess it are highly prized. (Mongol)?

2. Type with broad face, prominent cheekbones, eyes oblique, bridled, small, at the level of the head, nose flattened at the root, often prognathous superior jaw, black and abundant hair, the rest of the body glabrous or poor in hair. (Chinese).

3. Type differing from the two foregoing, by

its regular and horizontal eyes, without bridles, but preserving the broadness of the cheek-bones, the flattened nose, the yellow tint of the skin and the rarity of the hair. (Malay).

4. Type which approaches the European races by the disposition of the features of the face and the abundance of the pileus system. It is that of the Alinos, ancient possessors of the soil, driven to the wall by conquest, and living now in the northern part of the island of Yezo.

5. Finally, a novel element, the European hybrid, who takes as a rule the character of the occidental people, as to the shape of the eyes and the color of hair and iris.

Maget (*Journal d' Anthrop. de Paris,*) recognizes four hybrid races issuing from a dominant race. The Hamabêto (people of the sea-coast) forming the dominant race. It inhabits almost constantly the sea-coast, and is given to maritime occupations. It is a Polynesian race, red, with arched nose, eyes of small obliquity, short, as is everything belonging to the Japanese medium, whether animal or plant.

The hybrids of that race are in order of numbers:

a With the Mandchu-Coreans, more numerous in the regions of Nasa-Kendo, Sanindo and Hokuro-Kudo.

b With the Simili-Malays, more numerous in the island of Kiushiu and in that of Sikok. The race, noble, great (Koua zokou), and small (Chizo-kou), is usually connected with this type. It is the conquering race, and rules to this hour.

c With the Ainos. This branch, frequent in the Ken Akita and the Nambou, does not seem to pass beyond the banks of the Biwa lake. In the north of the island of Nippon, the hybrid Olino-Polynesians are rarely found apart from the sea-coast.

d With a black population (Negrito Polynesian blacks?) This branch of hybrids, which has only few representants, is distributed with some uniformity among all classes. It is recognizable by the Negroid appearance, the sombre and often blackish hue (the Arab negro hybrid tint of Algiers), the curling of the hair or their repeated undulations, the gracility of the calf which is very developed in the autochton (?) race, finally the relative smallness of the stature. (Mr. Maget describes and figures patches and points of black pigment which appear pretty frequently in the sclerotica of all the Japanese races. He sees in these spots an atavic trace of an ancient mixture of negro blood.)

These hybrids have not, in the country, any fixed point of concentration.

Pfoundes (Transactions of the Asiatic Society of Japan) says: "The Japanese were never a conquered nation; immigrations peaceably occurred by several different routes (the Malay Archipelago, Corea, Kamschatka and China); they bore a prominent part as a nation in the wars of the Indian Princes on the Malay peninsula, and thus fell in with the Arabs, who, before the sixth century, had gained a foothold in China. With them they voyaged to India and Africa. He observes also that there are many different types of men in various localities of Japan.

Brinton says: "The population of Japan is distinctly of mixed origin. The Mongolian and perhaps the Negrito, united with the Aino to produce it. And of what affiliation is the Aino? We cannot say. The Negrito or Eta people are, I believe, the primitive inhabitants of Indonesia, the Malays, etc., later arrivals. Whether these blacks reached Japan, or even Formosa, is rather doubtful, though some have argued in favor of it." He further says: "I am persuaded that island life exerts a more rapid influence, both on physical and linguistic traits, than continental life."

Faulds (Nine years in Japan) observes: "Regarding the affinities of the Japanese, we have no certain knowledge. They are 'Mongrels.' Excluding the Ainos, they are a great ethnic fusion to be further studied. They claim to have descended from heaven, and I hope they may all get back there again."

In our third great division of the people, are included the vast hordes of "Pariahs," the paupers, beggars, and lepers of Japan.

Originally, as is supposed, this class consisted of the Eta, the despised negroid element of the Japanese. The Emperor Tennu Tennô (672–686 A.D.), issued an edict against the use of animal food, which had previously been restricted at the first appearance of Buddhism in the country. This edict was probably instigated by the Priests, whose creed especially forbade the taking of life. Hence tanners, curriers and all leather workers, became "Pariahs." The Eta alone, the original "Pariahs," earned their living by working in skins, and converting them into leather. They also gathered lamprey or loach, which they sold on the bridges, about the moats and canals, which pious Buddhists would purchase, and liberate, by throwing them over the parapet into the water. This act of devotion was called Hojoji, and the Eta in their capacity of beggars, would offer up prayers for the welfare of their extraordinary patrons. The Japanese Encyclopædia (San-Sai-Dzu-Yé) explains that "the Eta were originally 'Etori,' or attendants, who killed animals required for feeding the Imperial falcons. The Buddhist priests interdicted this unfortunate people's sharing fire and shelter with the rest of the population, and thus the Eta came to constitute a separate race," and thus, possibly, they were subsequently refused privileges of intermixture with the various immigrations that contributed to produce national

hybridity. The "Hinins" (not human) were a class of paupers after the commencement of the Tokugawa dynasty (1603 A. D.). They were allowed to squat on waste lands, to build huts, and gained a livelihood by begging. They were employed to carry away dead bodies from the execution grounds. All of these sub-classes, Eta, "Hinin," "Pariah," beggar, have always been the associates of lepers, and are the more utterly despised. As I have stated elsewhere (Leprosy in Japan—Intermediary—host function in its propagation. *Cutaneous and Genito-Urinary Journal*, 1890), when leprosy attacked a member of a family, he at once strayed away, before his neighbors could know of his misfortune, and wandered, in beggar disguise, to some distant part of the Empire, that he might hide himself among the Eta. This was done, that the other members of his family might not become socially ostracised, or be refused marriage and communion by the neighbors, leprous taint, in bride or groom, being an absolute barrier to union. All beggars, therefore, were outcasts; they could neither eat nor sleep in any man's house, but only under trees, or in abandoned sheds. A dish that was once passed in alms to a beggar, was afterward destroyed, and the vessel from which he had drunk, was not used again. should he wash himself, perchance, at a well or public watering place, that water became, in public estimation, polluted. Hence the mendicants and despised classes, were forced to make use of streams, rivers and pools; and these were in consequence avoided by the more fortunate.

There are in Japan, according to estimate, 3,000,000 Eta, all, more or less, destitute. They officiate at executions of criminals, burials of dead bodies, and Buddhist cremation ceremonies. Griffis (The Mikado's Empire) very graphically refers to them, in his relation of a visit to the Cremarium at Fukui: "On the other side I saw a great heap of skulls, bones, clothes, bowls, utensils and other relics of the dead. It was the monument of a famine, which ravaged Echizen some forty years ago, and during which the poor and the beggars died in such numbers, that they could not be consumed or inhumed in the usual manner, that is, singly, but were cremated by scores, on heaps of brush wood. Near the house was a mound, containing many thousand cubic feet of ashes and calcined bones, the refuse, incineration of the furnaces during many generations. It was "ashes to ashes" instead of "dust to dust."

As for the living "beggars" to be met with in Japan, he says: "We cannot understand their chabu, komarimasu tempo, danna-san, dozo (please, sir, a penny, we are in great need of food), but we comprehend the object of their importunity. They are loathsome, dirty, ragged, sore. Now I wish I were a physician, to heal such vileness and suffering. Who would care to do an artist's or a poet's work when the noblest of healing needs to be practiced? The children run after us. The old beggars live in straw-kennels, by the road-side, some are naked, except dirty mats bound around them. The law of Japan does not recognize them as human, they are beasts! The man who kills them will be neither punished nor prosecuted. There lies one dead in the road. No! can it be? Yes, there is a dead beggar! and he will lie unburied, perhaps for days, if the dogs do not save the work from the coroner (?). 'And the beggar died;' will he be carried to Abraham's bosom?" These three classes have, during many centuries, lived very much apart from each other. Yet their alimentation was not so different as such a state of things would lead us to suppose; indeed, it has almost been nearly identical through the whole of Japanese society. The climatic influence was the same for all. They have been exactly in the same degree exempt from certain European diseases: puerperal fever, scarlet fever, diphtheria, endemic measles, etc. (in Japan measles occurs epidemically and at long intervals. I saw none. In 1876 and in 1882 separate epidemics occurred). It seems strange, therefore, the conditions being so equal, that the two great diseases, tuberculosis and leprosy, should be almost monopolies of special classes. Tuberculosis is the scourge of the aristocracy, the closely in-bred race of Japan.

Not that it spares the rest of the nation by any means; but it is to the lower classes singularly more merciful. In the high and inbred race the tubercular disposition, tainting and modifying every other disease, is really destructive, so much so that many strains of noble blood would have been extinguished long ago, but for the laws providing for the substitution of heirs. And this tainted tubercular race is a standing menace to the nation's blood, constantly inoculating it through concubinage. In strong contrast with this aristocratic pestilence, leprosy is the disease of our third class, the great crowd of pariahs and paupers. Between these two orders of Japanese society, afflicted each with its own peculiar malady, is situated the great middle class, a hybrid multitude, with no customs of close intermarriage, with active avocations; they are between the drones of high and low life, the workers of Japan. The privileged position of the upper class in regard to leprosy, I am disposed to consider as a fact, partly from personal observation, partly from information derived from native colleagues. In this conclusion I am corroborated by the testimony of foreigners also. Baelz (*Beiträge zur Lehre von der Lepra*, Tokio, Japan, 1885), treating of the matter, says: "A leper belonging to the upper classes I have never seen; one meets, however, as Dr. Miyake assures me, sometimes very rich lepers. For, in deference to hoary Jap-

anese tradition, marriage with members of leprous families is discountenanced, while the lepers intermarry unrestrainedly among themselves. As they are loath to be seen, they retire among their own people, and try, by the acquisition of wealth, to obtain at least such comforts of life as can be got for money. However, these are rare exceptions; most lepers are in wretched circumstances, and many of them subsist miserably on the proceeds of mendicancy upon the high roads or around the outskirts of popular places of pilgrimage. If we believe some Japanese data, the much despised and severely shunned class of the Eta suffers much more frequently from leprosy than the rest of the population." The same writer further observes: "That a manner of living, at variance with the laws of health, favors the eruption of the disease, is admitted unhesitatingly by all observers. The more wretchedly men live in the leprous countries, the more readily they fall a prey to the scourge. We have mentioned before the frequency of leprosy among the Japanese pariahs, the Eta, who, up to quite recent times, used to live in isolated hamlets, and with whom no man held any intercourse—a vessel they had used, anything that had been touched by them, was polluted. Nothing positive is known as to the origin of the Eta and the motive of their isolation. I think it probable that they are the descendants of leper colonies. A circumstance *which points very decidedly in that direction, is that the idea of uncleanness, as the Hindoos conceive it, in regard to the lower classes, is quite foreign to Japanese conceptions.*"

Wernich (*Ueber die Ætiologie, das Erlöschen und die hygienische Bekämpfung des Aussatzes*, Tokio, Japan, 1879) says: "If we turn to the conditions to which a hereditarily disposed individual, born in a climate which influences unfavorably the activities of the skin, is further subject, we cannot omit to cast a glance, in the first instance, on *race and nationality*. There could, of course, be no objection to our treating of the relations of races also, in the section where we speak of the heredity of leprosy. However, it will appear that the conditions of development contained in the race type, are less important for the production of leprosy, than those which touch immediately the vital relations. The disease, as well in Africa as in the Western hemisphere, is much more frequent *among the colored races* than among the white. In the East Indies, where the European residents fall very seldom a prey to it, all indigenous colored races are equally threatened by it; especially the Eurasians (the Anglo-Indian hybrids) furnish their very considerable contingent. In Southern Africa, the Hottentots are most involved, the Negroes follow, the whites are the most leniently treated. However, the supposable immunity of the European ceases, as soon as he lives in countries where the disease is at home. These circumstances suggest, for this point too, a taking into account of the skin system. That the latter is more disposed to disturbances of nutrition, more vulnerable, *in colored races*, is already made probable by the pigmental element, and it is approximately proved by the immense frequency and variety of the skin diseases to which *all colored races* are liable. But the acquired disposition of the European, which we have mentioned, finds also on this ground its most natural explanation. The violent alterations to which the skin of the European is exposed through profuse sudoral excretion, through the heat-rashes, through melasmata and general discoloration of the complexion, can, after a long time and accumulation, very well be designated as directly destroying influences. True, they display special vigor only then, when the European has to do without the preservatives which his *a priori* privileged position in foreign parts secures for him—when he must, as regards his social position, his life comforts, the care of his health, un-Europeanize himself. The troubles and injuries which present themselves to view in this connection, are, for the etiology of leprosy, of different value. *Much the greatest part of the leprous cases belong undoubtedly to the lowest and poorest layers of society.* If against this it is asserted that there is in Europe, in every country of it, an unleprous proletariate, exposed to all the injuries which hurt the body, and the skin especially, some grounds for the belief in the amendment of the general conditions of the lower classes will be found; nevertheless, when we shall examine the extinction of leprosy. High prelates, princes, crowned heads, were attacked with leprosy in former centuries; certainly those did not suffer most of the evils under which the lower classes are laboring. To the description of squalid misery, prevailing in some regions in Italy, Portugal, Spain, etc., has been opposed the fact, that some neighboring leprosy-free villages and communities present nearly the same wretched conditions of life. But these objections lose much of their weight, if we keep in mind that the eruption of leprosy results surely from a concourse of various causes, that a life passed in ease is probably not sufficient to obviate the consequences of a decided hereditary tendency in all cases. The majority of the cases of the high-placed rich lepers become preëminently clear, by a certain *modus* of acquiring the disease. While giving due weight to the objections made, we retain here the fact, *that the habits of life of the richer classes are generally a protection against leprosy, while the habits of life of the lower classes provoke the disease.*"

The portion of the lower class which bears the largest burden of leprosy—which is, so to speak, a vast human sewer, cleansing the upper regions of the nation, is scattered over the whole Japanese world. While the noblesse has been stag-

nating for ages, the lower set have been indefatigable wanderers upon the face of the Empire; friendless, lawless, starving, without shelter. In this social solitude, separated from all those offices of kindness and legislation which society affords to the other classes, they were reached by the Buddhist religion, comforted, fed, controlled and administered by it. Under the influence of that creed arose the whole system of customs and traditions governing leprosy. The all-pervading salutary rule of the Buddhist religion is illustrated in the following legend: Chiba-Ken, in the south of the Empire, is a sort of Mecca for the lepers. In many of the story-books we find related that, over a thousand years ago, there lived in that place a youth, twenty-one years old, who was stricken with the popular disease. He was loathsome to behold, and his physical condition repelled all his friends. In this sad plight, he dragged himself to the Temple of Naruba-Fudo, asking to be relieved from his horrible distress; and, to show his good faith, said that he would abstain from food for twenty-one days. After the expiration of twenty days, and in the middle of the twenty-first, Fudo appeared in the flesh to him, and graciously kissed the poison from his sores. Thus was the young man's health restored. The relief was so overpowering, that the quondam leper thought that he must be on the threshold of Nirvana; his rapture was so great, the feeling of gratitude so strong, that he resolved to do nothing but good henceforth. So he became a Buddhist anchorite, and eventually a shining light in the church. Fudo is said to be a double being, a combination of God and Buddha, and is represented, in many temples, with three faces and a body standing, phœnix-like, in the middle of a blazing fire (showing him to be the representant of a divine element of purification, for fire is to them the emblem of purity).

In the province of Sanuki, situated on a peninsula about 700 miles south of Yedo, we find a great multitude of these pariahs and lepers, the Japanese generally believing that the lepers who betake themselves to the immediate protection of Kon-pira, whose shrine is there, will be cured through his tender mercy. This superior being is at the same time God and Buddha. The climate of Sanuki is remarkable by its mildness and amenity, the province being nearly encircled by the sea. Almost all the lepers in the Empire, at some time of their lives, gravitate toward that holy region, and make there a stay of more or less duration. It was a medical teaching of the Buddhists, that a leper should not remain stationary in the place in which the disease had originated. Hence the roamings and disappearances of lepers. Most of the leper laws of Japan are Buddhist traditions, as unchangeable as the laws of the Medes and Persians. The Japanese firmly believe in Kon-pira's power to cure leprosy, and to this popular belief, as well as to some others of Buddhist origin, is due the segregation, and, to some slight extent, isolation, of this wretched multitude. He is, in the Roman Catholic sense, the patron of lepers; he takes care of them in every way. If a leper is robbed in Sanuki, he will compel the thief to restore his booty.

It is estimated that there are in Japan over a hundred thousand lepers and suspected lepers, mostly in the southern part of the empire, but distributed in various proportions over the whole country. There is no belief whatever in its contagiousness, nor in its sexual infection. Whence it came and how it originated no one pretends to know, although it is so common in the southern provinces, where syphilis also is rampant, and the temperament of the population lascivious in the extreme; yet the medical mind of Japan — that is, her physicians and priests—has not been led by this simultaneous presence to admit a congenial nature of the two diseases; on the contrary, they deny it most decidedly, and the proportions in which both diseases affect the different classes bear out their conclusion, for syphilis is more frequent in the middle classes than tuberculosis or leprosy.

The leper class of Japan is not the product of heredity, as their traditional class segregation of outcasts would have operated to destroy the taint; for it is generally recognized, at least in Japan, that the disease exhausts itself after five generations.

Let us pass now from the disease which squalid misery fosters among the poorest of the nation to its aristocratic rival, which the inbreeding of the upper classes favors in a different, though little less disastrous manner.

Remy, in *Arch. Gen. de Médecine*, makes the following statement: "Tuberculosis is not rare in Tokio (Yedo) and Yokohama; as usual, it is more frequent in the city than in the country, and, among the denizens of cities, it affects especially certain classes—*people who have no muscular exercise—the nobility*, the merchants, all who are given to study or have a sedentary profession. There exists between the inhabitants of the country and those of the city a difference similar to that which exists in our own countries. The former owe to the labors of agriculture a more complete muscular development. They are broader, more massively built. In Japan the tilling of the soil is entirely done by man's hand; the beast of burden is little used. It is man who breaks the glebe, carries the burdens, drags the loads. It is the same in the city with laborers. They are strong and muscular; but some of them have begun to indulge in drunkenness, and to get intoxicated with the rice brandy, the saké.

The city man is of weak constitution, and has attenuated limbs. He often lacks every bodily

exercise. Gymnastics, games, equitation, are not valued. The nobles have given up their practice of arms. The merchant, in his wide, open shop, the student in his chamber, remain motionless for hours. Nutrition, in consequence, is badly performed, and in winter the heating of the apartments is quite insufficient. A few coals in the middle of a vessel filled with ashes, the 'hibatchi,' or brasers, is the only system known. Insufficient in a space enclosed to the extent of two-thirds of its periphery by slight wooden frames, which are covered with translucent paper, this 'hibatchi' is perfectly useless in a shop, constantly open in all the breadth of its façade. The poor merchants crouching over their 'hibatchi,' their hands extended over the coals, offer a spectacle truly pitiful. Their clothing itself is little calculated to protect them against the cold. It consists, for both sexes, of dresses open in front and tightened around the waist by a girdle. The shirt is used by those who have come in contact with Europeans, and even by them seldom. A simple piece of stuff goes around the loins and extends to the middle of the thigh. Buttons are unknown; so that the dress, simply crossed and kept in place by the girdle, leaves uncovered the upper part of the chest, and leaves bare the legs also at every motion. The men wear sometimes cotton drawers, or tight breeches of blue linen. In the country, women wear a similar kind of inexpressibles, which makes them look like men; but in the cities, the legs of women remain uncovered. A simple, small linen sock covers the foot up to the ankle. Moreover, the air penetrates to the skin through the large orifices of the sleeves. To this inadequacy of defensive armor against the cold must be attributed the frequency of the pulmonary affections, bronchitis, pleurisy, catarrh. However, in Tokio, pneumonia is comparatively infrequent, even among laborers. As to tuberculosis, it must be referred to as complexity of causes: the insufficiency of bodily exercise, of the heating, a diet often too scanty, often excess in pleasures, to which the Japanese are uncommonly prone; finally, scrofula (?) and hereditary disposition. However, I am of opinion that there exists among the adults a good deal of acquired phthisis. The tuberculosis potatorum is almost unknown. There is only one alcoholic beverage in general use, the saké, or rice brandy; it induces intoxication rapidly, but as its daily use is not common, there are but few drunkards.

Tuberculosis, then, is either hereditary or acquired. It affects every age, children, adolescents, mature men. I have often seen it start with the left side of the lungs, as it is observed to do in the tuberculosis incident on sedentary avocations. Here are some particulars: it begins sometimes with exudatory peritonitis, whose products are resorbed, as in pleurisy. It is less frequently accompanied by digestive disturbances. The ingestion of the saké causes almost always abundant hæmoptysis."

Wernich (*Infections Krankheiten der Japanesen*, Tokio, Japan, 1878) speaks of the enormous frequency of tuberculosis in the Japanese islands. "The most important atmospheric element for its favorable course," he says, "is the low degree of atmospheric humidity. Next to dryness, uniformity of temperature must be considered as the most important element to secure rarity and a relatively better course of the diseased phenomena. A uniformly low temperature is, in this respect, to be preferred to a uniformly high one. After comparing these conditions with the element represented by the Japanese climate, it will not seem strange that in our about 2,200 cases, tuberculosis alone was represented by one-seventh, 325."

In speaking of the course of the disease, as exhibited to him in these cases, he points out the frequency and abundance of the blood effusions in them, *exceeding all limits known to him.* "In the freshly observed cases appeared the very remarkable symptom of a dark red coloration of the sputa, enduring for weeks, sometimes amounting to a regular hæmoptysis, *without any bad results ensuing*."

Herein Wernich evidently counts his cases of distoma pulmonale (Ringeri) with consumption. His percentage of ordinary middle class tuberculous cases would be otherwise excessive.

Baelz (loc. cit.) says: "The analogy between leprosy and tuberculosis, which we have repeatedly pointed out, is important enough to warrant a little more consideration. The bacilli of both diseases are distinguished by quite a number of common peculiarities, which differentiate them from other bacilli. Both diseases are probably contagious, but in a very feeble degree. In both the danger of infection diminishes in good hygienic conditions. Leprosy has a great deal of similarity with skin tuberculosis. Leprosy and ulcerous tuberculosis of the lungs affect seldom children previous to puberty.

At any rate, the two diseases must be considered as congeners, and it would not be without interest to examine whether there does not exist between them such a relation, *that in countries or in classes, where the one is frequent, the other is proportionally scarce.* As far as my knowledge of the literature enables me to judge, tuberculosis hardly appears to have played formerly the same part which unfortunately it does in our day."

He further remarks: "It is with tuberculosis that leprosy has the greatest analogies. Although every physician will concede now-a-days that tuberculosis is transmissible, experience shows, on the other hand, that for a large majority of mankind such a danger does not exist, in spite of most intimate intercourse. In order that a

man be affected with tuberculosis, the presence, and even the reception, of the bacilli is not sufficient, otherwise every physician and every nurse would be tuberculous. The point is, that the bacilli find *a proper soil for their nutrition; and this favorable soil consists in a mostly hereditary weakness of the tissues.* In a strong man, the cell devours the bacillus; in a weak subject, the bacillus devours the cell.

In this sense, *heredity is still of the greatest influence in the origination of consumption.*"

I came myself for the first time in contact with Japanese tuberculosis in 1873. I was then called from Philadelphia to attend Prince Adzuma, a brother of the Mikado, who, under an assumed name, had been studying at the United States Naval Academy, at Annapolis. He had been seized with a hæmorrhage of the lungs, and was removed to Wormley's Hotel, Washington. Dr. N. P. Lincoln, in consultation, after the incipiency of tubercle had been determined, advised the transfer of the patient to New York, for examination by the elder Flint, who directed his removal to his native country. I afterward saw him at his home in Yedo, and found that the disease had steadily progressed. He died in the following year. It has been my experience among the Japanese to find this disease most active among those people who take the least exercise—the higher classes, the nobles, the rich, the studious, and those given to the vices of high life. That, as we ascend the social scale of Japan, the general weakness of the constitution increases will be made evident, I think, by the well established fact that the court nobles and daimios do not produce much offspring. While, in the middle classes, four children to one mother is the average, in the daimios' class, one is the rule. This scarceness of progeny cannot, by any means, be ascribed to a want of sexual appetite. The Japanese are an amative race, and the Yoshiwara or prostitute system had to be instituted to restrain the passions of the Shizoku, or military nobility (the order next in rank to the hereditary nobility). Neither Shintoöism nor Buddhism had proved adequate to the task of keeping them in bounds. Hence, public morality had to make concessions, and society gave its countenance and approval to the marital union between the representants of society and those of that same Yoshiwara. It came thus to pass quite naturally that mothers sold their daughters to the brothels in order to give them a chance in life! Their sexual perversities are many. Pederasty and other unnatural vices are as common as in any country of Asia. In the northern portion of Nippon, Mutsu, composed of several noted provinces, and in famous Satsuma, in the south, there especially the "Millstone of Orientalism" hangs around the neck of Japan. The love of "bichonen" (fine boys) is a part of the aristocratic tradition. The last great insurrection in Japan was notoriously complicated by the jealousies of two statesmen about a beautiful youth. These vices have helped to weaken the race.

Maclay (Budget of Japanese notes), speaking of the daimio of Hirosaki Castle, says: "During the hot summer months, when the exhalations from the moat render the immediate vicinity unhealthy, he will journey off to his mountain villa, where he can spend a month or two in composing Chinese poetry in honor of the moon or his favorite concubine. About three or four times in season he will exert himself sufficiently to visit some hot mineral springs in the mountains, to soak out the licentious impurities of a past winter." And, speaking of the Samourai, or military nobility, not included in the hereditary nobility, but who are attendants on it, he says: "The truth is, about Perry's time, political affairs in Japan had become thoroughly run down. These Samourai were rapidly degenerating into a herd of voluptuous imbeciles. Licentiousness abounded in private life."

We can clearly see now, how this excessive inbreeding of an originally finely bred race, through so many generations, added to a luxurious life, in which every wish was gratified, and vice fostered in an unusual degree, the existence of a pampered aristocracy, obeyed and corrupted by that servile military order, always cringingly at its beck and call, until it had almost sunk into imbecility—how these conditions worked together to bring about the disposition to the disease, the tubercular soil. The whole order has thus become eminently susceptible to this special disease.

Holmes (origin of the Infectious Diseases, Jour. Am. Med. Assoc. 1890), says, regarding the bacillus of tuberculosis: It appears that it is unable to grow on any accidental or artificial media, under any presumptuous natural conditions of temperature and external surroundings. It is able to multiply in man and in some other mammals, and in a few related vertebrates. Therefore, we may presume that, should it be deprived of a living host, even a day beyond the few months during which its spores might retain vitality, the species would become wholly extinct, and the world be free ever afterwards from the ravages of this dreadful scourge. The bacillus of tuberculosis is then an obligate parasite of the warm blooded animals. When we consider what specific difference means, and how perfectly the bacillus of tuberculosis manifests this difference, and when we see how great is its geographical distribution, we are compelled *to go back far into the present geological epoch, and probably beyond it, for its origin.*"

He further says: "Looking upon these obligate parasites of man, *as of such ancient association, going back beyond the present geological epoch*

for the beginning of *syphilis*, *tuberculosis*, *leprosy*, etc., how is it possible that man has been able to withstand the attacks of so many enemies, for so long a time?

The very fact that he has survived, and that these parasites are unable to exist in any other media, than his living body, is conclusive proof that they are not essentially destructive parasites; for with destruction of the host species, occurs the destruction of the obligate parasite. Such a proposition appears to be axiomatic, but axioms occasionally need to be formulated. Given abundant opportunity of contagion, a destructive obligate parasite is inconceivable. It is possible only when its destructiveness does not interfere with the reproduction of the host species, as after the reproductive act has been performed."

And further: "While we are accustomed to look upon *syphilis*, *tuberculosis* and *leprosy*, as excessively destructive diseases, a moment's consideration is enough to clear our minds of this traditional notion. Syphilis, in the strong and healthy Caucasian, frequently runs the first and the second stages of its course, without recognition, and does not, therefore, interfere with procreation. When the infirmities of age confine the patient to unfavorable surroundings and habits of life, the tertiary symptoms come on with the reduced vitality and nutrition. Fatal or destructive syphilis, in the otherwise well and healthy, is rare. In children and in poorly nourished young people, and in those suffering from chronic diseases, it frequently appears as a terminal affection."

"Tuberculosis in the lymph glands of the neck, in the bones and joints, in the ear, and even in the peritoneum, is not very destructive. It is frequently followed by recovery. Even in the lungs, tuberculosis may run a chronic and rather harmless course, and interfere very little with the reproduction of the species. It is only after pyogenic infection of the tubercular tissues of the lungs, or other areas, that sepsis and symptoms of "hectic" appear. This sepsis is then the destructive factor, as it is in wound infection."

"Leprosy is the closest obligate parasite of man, so far observed. The *bacillus of leprosy bears a remarkable morphological relation and staining reaction to the prime factors of tuberculosis and syphilis.* It is almost never a destructive disease, and it appears only in those who could have already accomplished the reproductive act; therefore it does not interfere with the perpetuation of the species. It is conveyed by contact, but only with difficulty, and there is evidence that it is not necessarily hereditary; that is to say, healthy children may be born of those who are suffering from leprosy. The attendants on persons suffering from leprosy are not often affected with the disease, but often enough to demonstrate its contagiousness(?)."

Finally he remarks: "*Leprosy* conveys no immunity, for the disease rarely terminates in recovery, but the infection is accomplished with the greatest difficulty, and the spread of the disease is slow. *Syphilis* is not very destructive, it has a difficult but certain method of infection, and one attack does not so surely protect against subsequent recurrence. Instances of this kind could easily be multiplied, bringing in other factors, which act in producing immunity, or protection, or physiological resistance. *All brought about by the obvious necessities of the law of the survival of the fittest, and that of heredity.*

His conclusions are:

1. All obligate parasites are without exception, examples of *very ancient parasitism*, and what is of more practical moment, they are necessarily non-destructive to the host species.

2. *The destructive action of the obligate parasites is only manifested toward the weaker individuals of the race, and therefore they are a factor in the evolution of a strong and wise and morally temperate nation.*

3. The great field of expectant medicine lies *in the treatment of diseases, due to obligate parasites*, while the great field of preventive medicine is to be found in providing against infection with facultative parasites.

It is strange that these three obligate parasites of man, dating back probably to a mythical age, should have thus occupied each its own almost exclusive domain in the Japanese nation.

It seems as if the division of this nation, with its varying conditions of conjugality, has exercised a strong influence upon the development of these three diseases, which have so many congenial features.

Whether there is any value in the points which I have here endeavored to elucidate, whether they are of a nature to throw some light upon the portions of ethnical pathology to which they refer, I leave it for the decision of those who are in a position to speak with superior authority on these subjects.

The most important conclusions, I think, to draw from the facts exposed in these pages, are:

1. The close in-breeding of an exclusive class tends to its destruction, through the development of a tubercular soil, or through sterility.

2. Hybridity, as shown by a negative proof in the highest class of Japan, is a requisite for the formation of a healthy race, (with but one exception, represented by negroid element, as in the Eta of Japan); the mixture of races is therefore greatly to be approved of; it is one of the great elements of strength in our American nation.

3. As nature tends to eliminate, by her own occult operation, tubercular and leprous elements, from the healthy mass of the people, our only rational course is to assist her, by *isolating our tubercular patients*, as lepers are isolated in other countries.

ELASTIC LIGATURE IN INTESTINAL ANASTOMOSIS.

BY A. H. CORDIER, M.D.,
OF MCPHERSON, KAN.

There are not many surgeons in this country who have not, at some time within the last three years, done some experimental intestinal surgery, and the number of dogs sacrificed for the "advancement of science" are counted by the thousands. In no other way could this rapid advance have been wrought in so short a period. To Dr. Senn is due the credit of this desire to improve in the technique of intestinal surgery, and the advent of his decalcified bone plates marked a new era in this branch of our healing art.

The many modifications of his plates by eminent surgeons suggest to the reader's mind that something better is desired. The catgut mats and plates of Davis, the segmented rubber rings of Brokaw, and the plates of vegetable tissue of Dawbarn, are a few of the many methods devised by various surgeons, all of which I have used in my experimental work in the last two years.

When we recall the old and tedious method of joining the divided gut end to end, occupying an hour and a half of valuable time, well we may with joy herald the introduction of any operation which will reduce to a minimum the time of performing it, and thus rob the operation of one of its greatest dangers.

At the last meeting of the American Medical Association, the address on surgery was delivered by Dr. T. A. McGraw, of Detroit, selecting as his subject, "Use of the Elastic Ligature in Surgery of the Intestines." On reading the article in THE JOURNAL of the Association (May 16, 1891), I resolved to begin a series of experiments on dogs by this method, as described by Dr. McGraw. I sent to Milburn and Williamson, of Detroit, where the elastic ligature may be obtained at a trifling expense. By the 25th of May I had begun my work. The ligature is about the size of the lead in an ordinary lead pencil, very elastic and stout. By shaving the end of the ligature, it can be threaded on a needle much smaller than itself.

I quote Dr. McGraw's language as it is published —that is, that part of his paper describing the application of the ligature. "This is a decided advantage, for the reason that it is important to make as small a hole as possible through the intestinal wall, and also to have the ligature not only completely fill, but distend the hole, so as to prevent any extravasation of fæculent fluid. Now, by stretching the rubber during its passage, rendering it thin and small, it may be easily drawn after the needle, and its subsequent contraction will largely increase its size and cause it to more than fill the orifice. The ligature was in most cases passed through the gut in its long axis and at points most distant from the mesenteric attachment. Before passing it the bowels were stitched together by from three to six Lembert sutures, and afterwards similar stitches above the ligature served not only to give additional protection, but also to bury the rubber in the intestinal folds. Usually an inch or more was included in the ligature. After the cord had been drawn through both coils of the intestines, it was tied as tightly as possible in a square knot. Although the knot will ordinarily hold without further fastening, yet, as I wished to cut the ends very short, to cause as little peritoneal inflammation as possible, I always secure the ends so as to make slipping impossible. In tying the ligature, a silk thread is laid under it, first over the first turn of the knot and afterwards over the completed knot—this fastens the rubber against a possible slipping. In making the knot, the ligature should be drawn as tightly as possible without breaking."

In my experiments on fifteen dogs, I did not lose a dog from any cause. Antisepsis was observed as thoroughly as possible. My dogs were killed at various periods after the operations, and the results noted. I found the same condition of the effects of the ligature as described by Dr. McGraw. My dogs, rapidly recovering from the immediate effects of the operation, were up and eating in a few days.

In this short period, and with the very limited experience in doing an intestinal anastomosis by the elastic ligature, I am very favorably impressed with the method, and have made the following deductions:

1. It is an emergency method.
2. The ligature does not swell and produce undue pressure on any other structures than those intended to be cut through.
3. It is not acted upon by the alimentary juices, consequently cannot disappear before its work is completed.
4. It can be used in establishing the lumena of the gut in closing an artificial anus.
5. You do not get needles and threads tangled, as is liable to occur in applying any of the ring or plate devices.
6. Requires less experience and fewer assistants.
7. Does not open the gut until after plastic exudate has sealed the approximated surfaces, thus avoiding one of the greatest dangers in other anastomotic operations.
8. It is quickly performed, saving from fifteen to thirty minutes of valuable time to the patient.
9. The elastic ligature is so pliable and soft that no harm can possibly come from its presence in the intestines.
10. By using the elastic ligature and surrounding it with Lembert sutures, you bring and hold in contact as large or larger surfaces of peritoneum than you can get by any other operation.
11. The opening made is lined by mucous

membrane throughout, thus insuring its patency.

12. You do not produce any hæmorrhage from dividing the vessels of the intestines, as is often the case in using the plates or mats. This bleeding, although easily controlled, takes up some time to check it in many cases.

13. Its use is limited, and may be applied where there is a partial stenosis of the gut, or destruction in part of the intestine which will lead to a stricture if repaired. In the latter condition, the rent may be closed with Lembert sutures or resected, the ends inverted and closed in the usual way, and approximated by this method, and a communication will be established in four or five days.

14. This method finds special indications when an operation for cancer is performed, or for sloughing intussusception or hernia, stricture of any part of the intestinal canal where the obstruction is not complete or of long duration. All cases demanding an immediate relief by establishing the continuity of the canal, or within a period of four or five days, must be operated on by some one of the other methods.

15. Where it is necessary or advisable to make a large or long opening, as in operating on the large intestines, to prevent too much puckering of the walls of the gut, a double ligature can be applied, upon the principle of the "Tait Staffordshire knot," or the chain ligature of Dr. Peaslee, taking care to tie the ligature so the knot will come in the middle of the constricted and approximated surfaces, and is well closed in by Lembert stitches.

I recall one case in the human being in which I applied the approximation mats of catgut for the relief of a traumatic stricture of the ileum, the patient dying from shock a short time after the completion of the operation, I believe in part due to the almost unnecessarily prolonged time occupied in making anastomotic openings, introducing mats, untangling threads, want of more experience and skilled or trained assistants, all combined, taking up much valuable time. With the elastic ligature operation I believe this case would have recovered.

Dr. McGraw, in his able address, has left so little unsaid of his method and its results, that I refer the reader to his article.

I desire to thank Dr. Salthouse and Mr. Tull, a medical student, for valuable assistance rendered while carrying on my experimental work.

IN EVERY case of hysteria, whatever be the condition of the locality giving rise to the special symptoms, there is a pathological condition of the central cortical cells, and to these you must address your attention if you hope for success in the treatment. You cannot afford to scout the idea of disease simply because the peripheral lesion does not correspond to the symptoms existing. Disease just as important and far more troublesome is present, and will require the skill of the most expert for its mastery.—*Lancet Critic.*

SALPINGITIS; WITH A REPORT OF TWO CASES.

Read at the Forty-sixth Annual Meeting of the Ohio State Medical Society, Sandusky, O., June 17, 18, 19, 1891.

BY A. B. WALKER, M.D.,
OF CANTON, OHIO.

It has been but a few years since we have known much regarding diseases of the Fallopian tubes. Thirty-three years ago Bernutz, in his writings, clearly described the pathology of pelvic inflammations. But little advance, however, was made until Mr. Lawson Tait, in 1872, made known his remarkable success in removing diseased tubes by laparotomy.

The writings of Battey, in America, and Hegar, in Germany, on the removal of ovaries for other diseases than that of ovarian tumors had much influence in developing the proper method in treating diseases of the uterine appendages.

It was not until 1882–3 in America that the operation of laparotomy was made for removal of diseased tubes, the first operator being W. Gill Wylie, of New York.

During the years 1883–4 numerous cases were operated upon for salpingitis by gyecologists and surgeons, since which time the operation has been very frequently performed.

Previous to the investigations of such men as Bernutz, Tait, W. Gill Wylie and others, characteristic cases of salpingitis were very common, and went under the name of pelvic cellulitis. W. Gill Wylie claims it was true in this country until before 1882–3, since which time we find pelvic cellulitis to be a rare disease, and very seldom existing except as a phlegmon in puerperal cases.

Many of the cases we formerly looked upon as fresh attacks of old pelvic cellulitis we now find to be local peritonitis due to salpingitis.

Salpingitis does not have its origin in the Fallopian tubes except in rare cases, but is usually the result of extension of disease from the endometrium.

W. Gill Wylie says: "It is difficult to conceive a salpingitis starting up as a primary disease independent of any disease of the uterus or ovaries. It is generally conceded that it is due in almost all cases to the extension of inflammations from the uterus to the Fallopian tubes, and that endometritis, whatever be the cause of it, is liable to result in salpingitis."

According to Wylie's ideas, which are doubtless correct, anything that will cause endometritis may, by extension of the inflammation, produce salpingitis, as gonorrhœa, sepsis after abortion and labor, syphilis, tuberculosis, pessaries (stem in particular), unclean sounds, intra-uterine injections, sponges and other kind of tents.

Salpingitis may also be caused from tubal pregnancy. Anything that obstructs drainage

from the uterus or tube may cause distension of the tubes and result in salpingitis. Salpingitis, it is claimed, accompanies some of the eruptive fevers. Direct extension of inflammation from diseases of the ovaries, as a suppurative dermoid cyst, may cause salpingitis. Pelvic hæmatocele and cancer may also produce salpingitis. Suppressed menstruation from wet feet and cold may set up catarrhal endometritis, and by the narrowing of the cervical canal, which is generally the result of uterine catarrh, the proper drainage from the uterus is prevented, when the catarrhal secretion may be forced into the Fallopian tube or tubes and cause salpingitis. As the mucous membrane lining, the tube takes on the catarrhal form of inflammations, and the secretion becomes excessive—more than is drained off through the uterine end of tube; some of it escapes at its fimbriated extremity into the peritoneum, by which the tube or tubes become closed with adhesive inflammation, when a typical salpinx will follow.

Chilling of the body from eating ices or drinking cold or iced water during menstruation may in like manner set up salpingitis.

As we have learned that salpingitis is such a common condition, it should always be looked for in pelvic inflammations, for it is, in a large majority of cases, the cause of the trouble. A diagnosis, however, is very difficult when in the acute stage. But as the salpinx becomes well developed, it can generally be easily diagnosed after the acute symptoms subside.

The acute attacks women are subjected to who have salpingitis are usually local or pelvic peritonitis caused by septic matter that escapes from the fimbriated extremity of the diseased tubes or from a rupture of the tube. Any woman, then, that is so unfortunate as to have a salpingitis is in constant danger of an attack of peritonitis from the escape of septic fluid into her peritoneum, as I have described.

Catarrhal salpingitis, when the tube is not distended, cannot be made out by the sense of touch. In fact, it is only after adhesions or occlusions of the tubes, and they are distended, that a diagnosis can be made.

The symptoms of salpingitis are frequent attacks of local peritonitis; severe pain one week or ten days before menstruation; relieved after the flow is established. There is a dull, dragging, burning pain over the seat of the tube affected. To the sense of touch, a well-defined tumor can usually be detected by bimanual examination. If it is a hydro-salpinx, the tumor will be conical shape, walls of tube thin and elastic; the local pains and acute symptoms not so severe as in pyosalpinx; when if it is a pyosalpinx, the walls will be thick and inelastic; tumor club shaped.

Women who have both tubes affected are always sterile; when but one tube is affected and both ends of diseased tube closed, pregnancy may take place, but an abortion is very likely to follow.

To illustrate the two varieties just described, will report the following cases:

Case 1.—Mrs. Y., aged 34 years, married, good family history, enjoyed fair health, and menstruated regularly without pain until 19 years old, when, during her menstrual period, she drank freely of iced water when she was very warm while working in the harvest field. From this she took a severe chill, and had suppression of her menses, attended with pain, chills and fever. A catarrhal discharge from her uterus very soon set in. She suffered intensely from dysmenorrhœa at each period, not being entirely free from pain at any time.

She was married a few months after drinking the iced water, but lived a sterile life. Her suffering continued—sometimes worse, then again better. The pain was mostly confined to her left side, and was of a burning, throbbing nature. She would have frequent attacks of what she called "inflammation," which were doubtless local attacks of peritonitis from salpingitis. Suffered at times from cephalalgia, which was doubtless reflex from her uterine organs. Many different physicians prescribed for and treated her with no permanent benefit. The only relief she experienced from pain was while under the influence of morphia. August 20, 1890, fifteen years from first attack, I was called to visit her at Sparta, Ohio, in consultation with the attending physician, Dr. J. F. Fox. We found her confined to bed, very nervous and weak. Upon examination, her uterus was found to be stationary in pelvis from adhesions, slightly retroflected, with marked stenosis of cervix. A well-defined tumor was located in her left side which strongly resembled a salpinx.

An operation for the removal of the diseased tube or tubes was recommended as the only means of relief, which was readily consented to. She was then put upon a course of tonic treatment and requested to exercise daily in the open air. Two months later, October 30, after a thorough preparation of patient, I opened her abdomen, assisted by Drs. J. F. Fox, E. O. Morrow, W. H. Bocher, T. H. Brannan, C. H. Goodrich and D. L. Gans, and found a large hydrosalpinx on left side, with a small hematoma of left ovary. The salpinx was adherent in the lateral side of the posterior cul-de-sac, and to the broad ligament, and was with considerable difficulty removed, on account of the adhesions. The ovary was also removed. The pedicle was tied with a silk ligature and dropped. The right ovary and tube seemed natural and were left. There being no hæmorrhage of any account from the torn adhesions, the abdomen was closed without a drainage tube, silk sutures being used.

She made a good recovery, now weighs 140 pounds, a gain of 21 pounds since before the operation, menstruates regularly and without pain.

Case 2.—Miss B., aged 20 years, unmarried, family history good. At the age of 16 years she aborted at 5 months, from which she claims to have fully recovered. Two years later she contracted gonorrhœa, from which she did not recover, but was left a physical and mental wreck from pyo salpingitis. The result doubtless of gonorrhœal infection. December 8, 1890, I was first called to visit her, when I found upon examination, a double salpinx. Both of them closely adherent to the uterus and adjacent parts. They felt firm and inelastic, and so closely united to the uterus, that they seemed to be a part of it. She suffered continued pain, worse during the menstrual period. There was a purulent looking discharge coming from her uterus.

December 12, 1890, I opened her abdomen, assisted by Drs. T. M. Johnson and J. S. Pyle, when we found my diagnosis to be correct. A double salpinx, the left one was adherent to the lower part of the pelvic floor, as well as to the uterus. And it was with great difficulty that the adhesions were broken up. The right one was higher up in the pelvis and adherent to the uterus and broad ligament. The adhesions were also with difficulty separated; they were both ligated with iron-dyed silk sutures, close to the uterus and pedicles, seared with a galvanic cautery and dropped. They were so matted together by adhesive inflammation that we could not distinguish the ovary from the tube. In fact they cannot now be separated, as you can see by the specimens. As there was but little hæmorrhage no pus escaped into the peritoneum, and the abdomen was closed without a drainage tube. Iron-dyed silk sutures were used.

Patient made a good recovery and is to-day well and hearty, weighs heavier than ever before, and is perfectly free from pain; menses regular, and unattended with pain, but they continue from seven to ten days, There is still some little discharge from her uterus.

Case 1.—The cause of the salpingitis was evidently catarrhal endometritis, which was the result of suppression of her menses from drinking the iced water. Had this catarrhal endometritis been treated early by the proper remedial means, salpingitis might have been prevented, and the poor woman saved many years of suffering and the loss of an ovary and tube.

Case 2.—The cause was a specific one; quite different from case 1, and should teach us a lesson that gonorrhœa in the female is a more serious disease than we formerly looked upon it to be. For the disease may extend from the vagina to the uterus, and from the uterus to the Fallopian tubes and the peritoneum.

45 West Tuscarawas St.

ADDRESSES.

AN ADDRESS DELIVERED AT THE OPENING OF

THE SECTION OF SURGERY.

At the Annual Meeting of the British Medical Association, held in Bournemouth, July, 1891.

BY JOHN WARD COUSINS, M.B.LOND., F.R.C.S.,

Senior Surgeon to the Royal Portsmouth Hospital, and Portsmouth and South Hants Eye and Ear Infirmary.

RECENT ADVANCES IN THE TREATMENT OF TUBERCULOUS DISEASES OF THE JOINTS.

Historical Notes.—During the past thirty years very remarkable development has taken place in all departments of our art, and although I think the expansion of our knowledge in connection with diseases of the joints has been less brilliant than in many other directions, still it has not been less radical as regards the system of treatment. Until the time of the late Sir Benjamin Brodie confusion and uncertainty surrounded the class of disorders, but by the labors of this distinguished surgeon many of these diseases were disentangled from each other, and the affections of the articulating apparatus, which had been grouped together under the common designation of "white swelling," were clinically separated. In the fourth edition of his work on *Diseases of the Joints*, published in the year 1836, he graphically described tuberculous disease of the bones as commencing by the deposition of a transparent material in the cancelli, and afterwards undergoing transformation into a yellow cheesy substance. He drew a correct picture of the slow progress of the inflammation, the caries of the bone, the recurrent centres of suppuration, and the final termination either in imperfect ankylosis or complete disorganization of the joint, associated too often with pulmonary disease or some other visceral affection.

Brodie and Liston investigated the morbid alterations in articular cartilage and synovial membrane. They regarded the cartilages as prone to primary alterations of structure, and they initiated the doctrine that suppuration was a rare result of their primary ulceration, and that it took place only in the advanced stages of the disease, with caries of bone and destructive changes in the synovial membrane. They regarded the presence of capillaries as an essential condition of the inflammatory process, and they labored to demonstrate the vascularity of cartilage in disease. The pathological doubts and difficulties of these eminent surgeons occupied the attention of many of their followers, and their clinical observations were marked by clearness and accuracy, but their minds were prevented from forming correct interpretations of their facts by their strange prejudices and imperfect views of the healthy and morbid processes.

Some of the problems surrounding this structure were, however, at length solved by the labors of Redfern, Goodsir, and Rainey. These observers clearly demonstrated the changes which took place in cartilage by the perverted activity of disease. They asserted that it remained entirely non-vascular, and that its disorganization was always accompanied by changes in the size and form of the corpuscles, and the softening and breaking up of the intercellular substance. During the process of repair they discovered that fibrous tissue has formed, and that into this new substance vessels were projected from the vascular system of the bone and synovial membrane, and thus the difficulties concerning the vascularity of inflamed cartilage were cleared away.

The Old Pathology of Tubercle.—The loss of substance in articular cartilage long occupied a prominent place in the pathology of joint disease, and observations on the wear and tear of this texture in the joints of men and animals were utilized in support of a mechanical theory of incipient disease. At length, however, these narrow

doctrines languished under the expanding power of broader views. The belief soon became general that joint disease could have an origin in any of the joint structures, and that most frequently the error commenced in the bone or the synovial membrane. In a large proportion of chronic affections the morbid changes were found to be the results of a peculiar inflammation, attended by the deposition of a semi-transparent exudation, which had a tendency to unhealthy suppuration, and to undergo fatty transformation. Pathologists diligently studied the scrofulous affections of bone, and for a long period of years the essential element in the process was described as a deposit of tubercle—a formation of low type which sooner or later excited destructive changes in the surrounding structures. In one case a synovitis issued in a gelatinous degeneration which ultimately extended to the bone and cartilage; in another case, the deposition of tubercle in the cancellous structure caused an expansion of the bone which insidiously progressed towards softening and caseous changes, inflammation of the fibrous capsule of the joint, and hopeless destruction by suppuration and caries.

The Scrofulous Diathesis and Tubercle.—Now, the universally accepted theory of all these changes was the unfortunate possession of a bodily or constitutional condition which was styled the strumous cachexia. This was explained as an altered direction of the normal nutrition of the system, which could make itself visible on slight provocation in any of the structures or organs of the body. Scrofula was regarded as an inherited or acquired constitutional condition, which might at any moment assume the appearance of a distinct tuberculous disease. On the other hand, tuberculosis was always manifested by a wider departure from normal nutrition, and presented new and lowly-organized formations which were deposited somewhere in the organism in the course of chronic strumous inflammation. Virchow described scrofula as a disease of the lymphatic system, and tubercle as a new product derived from the lymphatic elements of connective tissue.

Universally, then, tuberculosis was defined as in inheritance very variable in individuals; at the same time, outside influences were recognized as powerful factors in kindling the smouldering flame into activity. For many years the nature of tubercle received profound investigation, and on every hand the results of research tended to establish the time-honored theory. The microscope failed to detect in it a specific element. All the histological constituents were in turn considered the essential ingredient in the deposit. Cells and granules, epithelial elements, and cells of giant form, were searched for some characteristic quality. Some of them appeared embedded in a fine homogeneous stroma, while others were either shrivelled or drowned in particles of oil, or else buried in molecular matter. The morbid changes in bone were searched over and over again, but in the process of degeneration and caseation only negative elements were discovered. In one part the osseous structure was observed undergoing destruction, in another the osteoblasts were at work forming masses of protecting bone. With one voice the microscopists declare that they could find no specific element, and that tubercle was so definite in structure that it could be recognized by negative rather than by positive characters.

Now these were the opinions which for more than half a century were confidently taught in all the schools. Surely the experience of our day is sufficient to convince us that there is no part of our pathology which may not be transformed, and no theory which may not be pulverized by progress. These doctrines were considered orthodox for many years, and by the profound investigations of many eminent men all difficulty appeared to have passed away. Tubercle had been examined by the best observers in the civilized world; thousands of clever eyes had gazed at it with intense persistency and curiosity, and with a remarkable unanimity they pronounced the opinion that it really contained nothing but cells.

The Modern Pathology.—In the year 1882 the whole pathology of tuberculosis underwent a great evolution by the complete demonstration of the life-history of the tubercle bacillus. The disease occurring in any tissue of an organism must now be regarded as a specific disorder, the bacilli as the direct cause of all the morbid changes, and their presence as the distinctive sign of the disease.

Now it is only by drawing a comparison between the old and the new pathology that we can really decipher the magnitude of the revolution in our conceptions. We no longer fight about the primary seat of the disease, for it is now certain that it may commence in any of the tissues of a joint. At the onset it may be synovial or osseous, and when the origin is in the latter structure it may select its surface or its substance. Strumous disease of the bones and joints is the same disease as tuberculous disease of the bones and joints; for in all these affections a specific deposit can be detected. Tubercle bacilli are never found but in this special product, and wherever the tuberculous tissue is discovered this microbe has obtained a resting-place. Their number may vary in the diseases of different structures, and also at different periods of the same disorder; still, when only a few are present they will be found by careful scrutiny.

The new pathology of tubercle is sustained by a mass of evidence derived from microscopic research, the artificial cultivation of the parasite, and experimental inoculation, so that the old notions which had long surrounded the disease have been numbered with the things of the past. The long-accepted causes, too, have been dislodged from their position, and are rightly grouped as morbid tendencies. The inheritance of constitutional peculiarities, the liability to chronic inflammations, and the susceptibility to external influences are thus regarded as essential conditions which help the microbe to establish itself within the body. Still, these factors are not less potent because the specific character of tuberculosis has been recognized. Hereditary proclivities and physical peculiarities of structure have not fallen into insignificance, but in their new position it will be possible to better estimate their potency.

Hereditary Transmission.—As regards the old doctrine of hereditary transmission, must we abandon it altogether? How is it possible for the disease to be conveyed from the parent to the embryo, unless the spores of the bacilli are themselves actually transmitted? The living particles have in themselves no penetrating power, still their vitality is certainly intensified by contact with living tissues. As a general rule, they make an entrance into the body by the mucous surfaces, and then their diffusion is secure through the ever flowing streams of blood and lymph. We know that they find their way into the bones and joints, and there appears nothing likely to prevent them getting entangled with equal ease in the placental structures. I believe, however, that there is at least some evidence in support of the assertion that the microbe can pass freely from the mother to the fœtus.[1] The great discovery of Koch may have around it many problems yet to be unraveled. It is, however, a fact of history that, by his profound research, he brought to light from the microscopic elements of tubercle a living atom which no human eye had seen before. Some have been so generous as to call it a lucky hit, but let us remember that the accident happened to a man of untiring energy and prodigious power of mental concentration, and these are qualities as essential for success in science as the full activity of the higher intellectual forces. I regard this power of mental concentration as the noblest element of genius. Do not the histories of men illustrious in science exhibit a passion amid their solitary labors? Every line of eternal truth that has been added to our knowledge, every new fact that has been brought to light from the deep secrets of the universe, every noble success in the

[1] Birch-Hirschfeld and Schmöll, Beiträge zur. path. Anat. und zur allg. Path., 1891, p. 429.

onward march of science, every triumph achieved over the mysteries of the natural world, are the offspring of unceasing devotion.

Arrest Possible in the Early Stage.—The modern pathology of tuberculosis has already exercised a salutary influence over surgical treatment and the progress of conservative surgery. Its distinct recognition of a specific and infectious disorder, in all its various manifestations, has placed the hope of arrest on a very different basis to that which it previously occupied under the old constitutional theory. During the early stages of joint disease the morbid action is often localized, and, therefore, arrest is at least possible. There can be no reason why a joint or a bone should not recover, and the tuberculous infiltration atrophy, and ultimately shrivel into a fibrous scar, just like a similar deposit in the apex of a lung. If the number of bacilli found by microscopic observation in a part are to be taken as any indication of the activity of the disease, then repeated observations are favorable to the conclusion that incipient disease in the articulating apparatus is more hopefully situated than incipient disease in the pulmonary tissue.

It is true that the early arrest of tuberculosis has long been the result aimed at by treatment. Half a century ago Brodie described the slowness of the process. The cure in the advanced stages, he said, began when the sinuses closed and the œdema of the limb subsided, but the morbid changes in the joint generally terminated in more or less anchylosis, caused by the destruction of the articulating surfaces. The diseased limb should be kept in a state of perfect quietude; not that this alone would restore the bones to a healthy condition, but it would do much to prevent the inflammation extending to other structures. He recommended constitutional treatment, residence at the seaside, nutritious diet, and exposure to fresh air.

We now restrict the term tuberculosis to those local and general changes which are directly caused by the irritation of a specific bacillus. Under favorable conditions, isolated patches of tuberculous formation may undergo atrophy, and the infiltration around them cease to extend. This arrest is the result of the timely death of the micro-parasite, for surely by its destruction alone the morbid action in the diseased tissues can be localized, and the individual delivered from the danger of a diffused tuberculosis. What, then, constitutes the grave difference between this curative process and the insidious progress of the disorder? Does it depend upon the strength of the inoculation and the number and vitality of the bacilli; or is it due to the intensity and persistency of the predisposing conditions or other factors in the causation which may be vital, or chemical, or structural peculiarities of blood and tissue? In the light of new facts, I think we must admit that the case is really dependent upon the complete destruction of the specific cause within the affected structures. At the same time, experience teaches us that arrest is possible, and that this fortunate issue may be obtained by the healthful influence of sunlight, pure air and good food upon the whole organism. I wish some philanthropic millionaire, for the sake of humanity and science, would try the experiment of submitting five hundred scrofulous children living in the slums of our large cities, and suffering from incipient joint disease, to the renovating power of good food, in combination with seaside purity and brightness, for at least eighteen months, and I am sure some of them would by these potent remedies, and the application of a simple splint, escape from more serious surgical treatment.

Value of Expectant Measures.—In the management of joint disease we must take care to select the right moment for surgical interference. It is often an anxious question to decide when expectant measures ought to be abandoned. In the early stages the diagnosis may be open to question. Sometimes the threatening symptoms may be traced to a traumatic cause. There may be nothing in the local condition to indicate its specific character, and the general conformation and nutrition may not point to any predisposition to tuberculous inflammation. The affected joint may be swollen and occasionally painful and tender. Its outline may be altered and the normal movements impaired, and these slight indications may be marked by a persistent tendency to recurrence. In some cases the morbid action appears to have subsided, and the joint structures to have regained their healthy condition, but this favorable quiescence may be disturbed by the slightest injury, and any trivial accident may rouse again the dormant malady. Occasionally we obtain evidence of arrest many years after the favorable issue has occurred. I have seen several cases in which slight shortening of a limb has not been recognized until puberty, the period of life when the skeleton is in a condition of active development. The osseous deficiency is the result of latent mischief near the growing line, and the remnant of bygone epiphysial inflammation which happened during early life.

The Late Hugh Owen Thomas.—A few years ago strumous children laboring under chronic joint disease were kept in bed for many months, but now expectant treatment can be carried out more hopefully by combining rest and protection of the limb with fresh air and exercise. The management of incipient joint disease has fortunately undergone a silent revolution through the mechanical genius of the late Hugh Owen Thomas, of Liverpool. His surgical appliances are admirably adapted for taking off concussion, arresting friction, and imparting support and protection without pressure; at the same time they are so simple in construction that the patient can adjust them without assistance. Thomas's splints have been utilized by surgeons in all parts of the world, and the name of our old colleague will long have an honorable place in the surgical records of our times.

Tuberculin.—When, a few months since, the celebrated announcement reached us that a new remedy had been discovered which possessed the remarkable power of causing the necrosis of living tuberculous tissue, a new method of arrest appeared probable in recent cases, and material improvement in others of greater severity which would prepare them for surgical treatment. It is not my intention, however, to invade the arena of my distinguished colleague, Mr. Watson Cheyne, who has promised today to tell us the results of his elaborate investigations with tuberculin, but I feel bound to mention that although I have used the remedy in many cases of joint and bone disease without decided benefit, it will still receive from me a full and impartial trial. It is certain that it contains an agent which is capable, even in almost an infinitesimal dose, of exciting active changes in the body containing any traces of active tuberculosis. In the chemical aspects of microbial life, and in the complex bodies which are formed by the artificial cultivation of the bacilli themselves, we discern the direction from which we may anticipate future discoveries. I regard the search for a remedy amid the growth of these living particles as a splendid effort to reduce the magnitude of a world-wide pestilence, for which, up to the present moment, no really scientific treatment has ever been propounded. The great German investigator has not yet finished his work; let us patiently wait for his results, and keep ourselves free from prejudice, hoping that his daring assault upon the most deadly of diseases may ultimately be crowned with success.

Surgical Treatment of the Past.—The recognition of the local character of tuberculosis in diseases of the joints has opened up the high road to many of the recent advances in surgical treatment. Sixty years ago these disorders were described by Sir Benjamin Brodie as having their origin in the cancellous structure of the bones, or as a consequence of inflammation extending from the synovial membrane to the osseous tissue. Morbid action, he said, commenced sometimes in one and sometimes in another texture, and in the advanced stages, all the

structures of the joint became involved in the disease. At that time, however, the surgical treatment was really little else than splints and plasters, incisions and punctures, and at length amputation as a final remedy. The constitutional theory of tuberculosis blocked the road of progress.

Fergusson and Butcher.—Between the years 1830 and 1840, Syme in Scotland and Liston in London revived with energy the resection of joints for disease, an operation which had been occasionally performed by British surgeons half a century before. But it was not until Sir William Fergusson had successfully practiced it that excision became an established manipulation on all the joints, and professional prejudices were vanquished. Only a few months since, Richard Butcher, of Dublin, passed away after a long and brilliant career. He labored, too, in his day, to resuscitate the practice of excision, and devised the well-known saw especially for joint operations, and this ingenious instrument has certainly assisted the progress of conservative surgery.

Early Efforts.—Until the last few years early operations in joint disease had scarcely received any attention. In 1878, Volkmann, the inventor of the cutting spoon, performed several partial excisions in recent cases of hip-joint disease, but his results did not stimulate him to further trials. Since the year of the pathological revolution (1882) many favorable cases have been recorded, and I feel confident the practice, although still regarded by some as experimental, has already saved many limbs from graver operations.

Advantages of Early Operation.—Whenever the indications for surgical interference are clear, early operation must be attended with many advantages. The risk of delay is always in proportion to the progressive and obstinate character of the disease, and timely aid will often prevent its extension, and at the same time deliver the patient from the danger of deep infection and the development of secondary tuberculous centers. The only hope of cure must depend upon the complete removal of the diseased tissue, and the facility with which this can be accomplished rests entirely upon the extent of the local mischief. The preservation, too, of useful mobility in the joint may be anticipated when the morbid process is well localized, so that the manipulation involves only a limited excision of synovial membrane and a partial division of the fibrous capsule.

Partial Arthrectomy.—For the successful performance of a partial arthrectomy there must be clear evidence of a localized deposit. In some cases children have exhibited very little pain or lameness, but the joint has been in some part swollen, with the capsule thickened and the bones enlarged, but without any indication of softening or suppuration. By a well-directed operation near the neck of the femur or the head of the tibia, search has been made for a spot of tuberculous infiltration, with the result that a carious cavity has been found and small sequestra successfully removed. Surely these are exam[2]ples of the enormous gain obtained by early operation. If the latent disease had not been detected and cut out, the issue must have been irreparable injury of the articulation in every instance, and a more serious manipulation under conditions far less favorable.

Another recommendation for early arthrectomy is the little danger that attends the operation. With ordinary surgical precaution the risk may be fairly considered trifling, even when a portion of bone has to be resected. After a full incision in the most convenient position for exploration, and carefully defining the disease, the infiltrated tissue must be excised with the scissors or cutting spoon, and the cavity thoroughly flushed with hot water. To insure rapid union, the surface should be then dried, and the wound closed with deep and superficial sutures. The limb must be kept at rest until the healing process is complete. Up to the present time a great many partial arthrectomies have been performed in this country by different surgeons, but I am not prepared to state the exact proportion of their permanent successes; and it appears to me that a report of the results of early operations from many hospitals would prove at the present time a very valuable record.

Advancing Local Tuberculosis.—The articular cartilages are seldom the seat of primary disease, for as a general rule, the morbid process has its origin either in the synovial structure or the articular extremity of the bone. When the osseous tissue is the seat of a tuberculous infiltration, the evidence of its existence is often wanting until softening occurs within it, and inflammatory reaction takes place around it. As soon as these infective changes reach the synovial membrane, they extend to all the structures of the joint. Sometimes they make their way through the superficial cancelli to the outer layer of the bone, and then superficial caries and slow suppuration are the result. At another time the morbid process advances in the direction of the articular cartilage, softening and erosion of the structure follow, and then inflammatory changes which issue, unless checked by surgical treatment, in chronic abscess, caries of bone, imperfect arrest of the disease, and finally anchylosis. Now in all these forms of advancing tuberculous disease, surgery offers the only scientific method of treatment, and we can safely repeat our incisions, scoopings, scrapings and cleanings, until the disease is eradicated and a useful joint preserved.

Sudden Infection of the Joint.—But instead of a slow disorganization, the tuberculous centre may be suddenly discharged into the capsule, diffusing the infective material over the whole synovial surface, and kindling suppurative inflammation with great rapidity. A few months since I performed arthrectomy on a child for acute infection of the knee-joint. In 1889 the little patient was under my care, in the Royal Portsmouth Hospital, laboring under a small subperiosteal abscess over the head of the tibia, close to the reflection of the synovial membrane. The swelling was freely incised, and a considerable deposit of caseous material cleaned out with the spoon. The bone was roughened perilously near the articular edge, and the parents were especially warned of the danger. Soon after the child left the hospital, the swelling slowly recurred without either pain or lameness. In the month of July last she hurt her knee during a game of play. Acute pain immediately followed the accident, attended with rapid swelling of the joint and fever. Three days after she was readmitted to the hospital under my care. The knee was at once freely opened on both sides, and the inner incision was carried through the abscess cavity over the head of the tibia. The capsule contained about 3 ozs. of a turbulent fluid with many flakes. The infiltrated synovial membrane was freely incised with scissors, the joint thoroughly cleansed, and the limb carefully placed on a back splint. Irrigation was continued for a week. The child was discharged quite well in January. The movements of the knee are now normal, a result due to immediate treatment and the limited injury of the synovial membrane.

Complete Arthrectomy.—Permit me now to offer a few remarks on the surgical treatment of more advanced cases, in which the morbid process is too extensive for any partial operation. In the performance of complete arthrectomy, a free division of the ligaments and capsule is necessary for the exploration of all the recesses of the articulation, and the excision of deep infiltrations of the synovial and osseous structures, so that the preservation of only a limited mobility must be anticipated. The whole of the pulpy granulation tissue must be dissected off, and the ligaments and cartilages carefully scraped. It is absolutely necessary to remove every particle of the diseased synovial membrane, and all tuberculous foci in the bones must also be cleanly cut out with the gouge. Care must be taken to prevent any remnants of the infective tissue being left behind on the raw surfaces, and

[2] Successful cases reported in the British Medical Journal by Messrs. Watson Cheyne, A. Barker and Charters Symonds.

the accidental reinoculation of the disease through the medium of the fresh incisions. I regard the method advocated by Mr. Arthur Barker, of flushing with hot water the seat of operation, to be the best way of carrying out these important precautions, and for the rapid performance of this part of the operation, his ingenious scoop and irrigator will be found of great practical utility. The operation of arthrectomy of the hip can be readily performed by the anterior and vertical incision and division of the neck of the femur with the saw, and then the excision of the infiltrated tissues. After a simple protective treatment for a few weeks, and the application of a Thomas' splint during convalescence, the results are often very satisfactory.

Surgical Treatment in the Advanced Stage of Hip Disease.—With reference to the old method of operating in the advanced stages of the disease, after suppuration has been proceeding for months, and sinuses have long riddled the soft parts, and when the unfortunate patient has been exhausted by a general tuberculosis, I sincerely hope it will soon be cast into the shade forever by the light of modern progress. It is my experience that these distressing cases recover more frequently by simple measures, consisting of free incision, scooping, irrigation and drainage, and that the ultimate results are more satisfactory than those which follow the practice of severe and dangerous operations.

Complete Arthrectomy of the Knee-joint.—In performing complete arthrectomy of the knee joint I consider the old horse shoe incision, and an oblique division of the ligament patellæ, better than any other method for obtaining free access to the interior of the cavity. The practice of lifting up the tuberosity of the tibia instead of division of the tendon may be found very useful in some cases. It is important to clean carefully the lateral and crucial ligaments, and to avoid damaging the cartilages and articulating surfaces. Sometimes carious bone can be removed with the gouge outside the capsule of the joint. It must always be our object to secure the complete extirpation of the diseased structures, and to preserve as far as possible the mobility of the articulation. Fortunately the limb is not shortened, and the development of the bones is scarcely impaired. The articulating surfaces are in a great measure preserved, and the operation when compared with resection of the joint is attended with less risk of life. After arthrectomy I have seen a sound and useful limb with movement to the extent of 45°, and the patient capable of standing and walking many hours every day without fatigue. So good a result can only be anticipated under favorable conditions and early surgical interference. I have received from my colleagues in different places very varying reports of their successes. Sometimes they claim firm ankylosis, but at other times their operations have issued in weak limbs and joints, tending to serious flexion and displacement. Many of them were, no doubt, too late arthrectomies, and the careful excision of the bony surfaces would have been followed by firmer and better results.

The Old Operation of Excision.—With reference to my own practice, I prefer at once complete resection in all cases marked with old sinuses and the carious remnants of old infiltrations. My method is to freely open the joint and to remove as thin a layer of bone as possible from all the articulating surfaces. The gouge is used for cleaning out any infiltrations, and then the patella is divided vertically with the saw. After cleaning every recess in the capsule, the bones are jammed togther as tightly as possible, the periosteum is carefully sutured, and the wound closed, except at the extreme ends of the incision. Now, I do not presume for a moment that my results are exceptionally good, but I beg to submit to you photos of some of my patients upon whom operations were performed many years ago. I have often questioned them with reference to the inconvenience of the ankylosis, and, without exception, they have regarded it with indifference. One patient volunteered the remark that the only annoyance her stiff limb caused her arose from the necessity, when sitting in company, of crossing her legs.

Conservative Surgery in the Advanced Stages of Tuberculous Disease.—I am no advocate for any attempt at conservative surgery in the advanced stages of the disease, not from the dread of deepening the general and local infection from re-inoculation through the seat of operation, but rather from the feebleness of the vital power which has been slowly undermined by prolonged suffering and suppuration. The intensity of the disease has been quickened by a chronic septic condition of the system, and it is the danger of its sudden aggravation, even with every possible precaution, which adds to the risk of surgical interference. The microörganisms of septicæmia, or their poisonous products exert a marked influence over the course of tuberculosis, for their presence reduces the resisting power of the system, and helps on the local and constitutional spread of the disease.

But it is not only septic infection in its various forms that we have to combat, but every other kind of acute disorder of the blood. Children especially are liable to be attacked with any of the infectious fevers; and these are all attended with peculiar risks. Measles, from its disturbing influence over nutrition, is prominent among the group, for its power of rekindling tuberculous inflammation.

Occasionally, however, I think that my experience has seemed to point in the opposite direction, and that an accidental blood storm has exercised a remarkable effect on the course of the malady. A young woman, who for many years had suffered from old disease of the knee, came under my care in consequence of acute inflammation of the joint, which she attributed to injury. Prior to this event she had undergone a good deal of surgical interference. Some years since I did a plastic operation for her, and in 1887 I performed abdominal section for pelvic suppuration and chronic peritonitis. A few days after her admission to the hospital her distress was so great and the constitutional disorder so acute, that I decided to amputate the leg. She was, however, I think very fortunately attacked with severe erysipelas of the head and face, and after a few weeks' dangerous illness her recovery all round was so remarkable, and the joint symptoms so much reduced, that I did an excision. The wound healed with rapidity, and she is now earning her livelihood on two legs instead of one.

Now, notwithstanding the opinion I have expressed concerning the risk of late operations, exceptions occasionally occur in practice when interference appears to be the better course. There are certainly cases of chronic tuberculous joint disease marked by secondary centres and general infection, and even aggravated by a chronic septic condition of the system, in which the vitality of the tissues and the residue of constitutional vigor appear sufficient to warrant an effort in the direction of conservative surgery.

Permit me to offer you two examples. 1. Here is the photograph of a girl taken a few months after excision of the elbow. At the time of the operation she was laboring under partially arrested hip disease with still one discharging sinus, and tuberculous deposit in many parts of the glandular system. She is now able to follow any occupation. 2. This is the likeness of a young woman, an orphan, with strong tuberculous history, upon whom I did a similar operation on a joint riddled with sinuses and surrounded with infiltrations. She had distinct physical indications of pulmonary complication, old disease of the opposite knee, and a persistently elevated temperature. She has now recovered with a useful arm, and is enjoying apparently good health. I am quite aware that these may prove only temporary successes, but it is our duty to look always on the hopeful side. I am, however, quite certain that their future prospects have been improved by surgical interference.

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BY-LAW IV.—THE PUBLICATION OF PAPERS AND REPORTS.

No report or other paper shall be entitled to publication in the volume for the year in which it shall be presented to the Association, unless it be placed in the hands of the Board of Trustees on or before the first day of July. It must also be so prepared as to require no material alteration or addition at the hands of its author.

Authors of papers are required to return their proofs within two weeks after their reception; otherwise they will be passed over and omitted from the volume.

Every paper received by this Association and ordered to be published, and all plates or other means of illustration, shall be considered the exclusive property of the Association, and shall be published and sold for the exclusive benefit of the Association.

The Board of Trustees shall have full discretionary power to omit from the published *Transactions*, in part or in whole, any paper that may be referred to it by the Association, or either of the Sections, unless specially instructed to the contrary by vote of the Association.

LONDON OFFICE, 57 AND 59 LUDGATE HILL.

SATURDAY, AUGUST 15, 1891.

EMULSIONS.

Among the interesting and valuable papers read before the Tenth International Medical Congress at Berlin, was one by Dr. B. K. RACHFORD, of Cincinnati, on the fat splitting properties of the pancreatic juice. A more extended presentation of the subject by the same author appeared in a late number of the *Journal of Physiology*. RACHFORD opens his paper with some remarks on emulsions, which it is our purpose this week to review briefly.

In 1878 GAD called attention to the fact that when a drop of oil containing 5½ per cent. of fatty acid was carefully placed on a one-fourth per cent. solution of sodium carbonate, a perfect emulsion was immediately and spontaneously formed. A very little more or less than 5½ per cent. of acid gave an incomplete emulsion. From these facts GAD concluded that outside mechanical force was not necessary to the formation of a perfect emulsion, but that the chemical force which was developed from the soap formation, was itself sufficient to break the oil into the finest globules, and that the soap formed coated the globules and maintained the emulsion.

RACHFORD found that no amount of stirring or shaking would produce a permanent emulsion of either neutral or rancid olive oil and distilled water, nor with neutral oil, and one-fourth per cent. carbonate of sodium solution, but that shaking would produce a good permanent emulsion of rancid oil and one-fourth carbonate of sodium solution, even though the oil contained a very large or a very small percentage of free acid. Yet the spontaneous emulsion only forms when a definite percentage of free fatty acid is present.

When olive oil is heated it is partly split up into fatty acid and glycerine, and in this condition is readily emulsible, but if it be neutralized, it is no longer emulsible, showing that the acid is necessary for its emulsification. As RACHFORD suggests this fact is no doubt of importance in connection with the cooking of fats, the partial splitting up of the fat by the cooking preparing it for its subsequent emulsification.

RACHFORD also found that if bile be present an emulsion cannot form, although all the conditions otherwise favorable to its formation be present. If bile be added to an emulsion the moment after it is formed, the emulsion rapidly clears by creaming, but no free oil appears on the surface. Here it seems that the soap not in membranes is dissolved; this increases the specific gravity and diminishes the viscosity of the liquid, and as a result the soap-coated globules rise to the surface as cream. If bile be added to an emulsion some minutes after it has formed, it has no effect in destroying the emulsion. The stronger acids, even in very dilute solution, rapidly destroy the emulsions, the free oil rapidly rising to the top of the liquid.

The observations as to the influence of bile on the formation of emulsions are particularly interesting, as they show how bile regurgitated into the stomach, could very seriously embarrass the digestion of fats.

The formation of the spontaneous emulsion was used by RACHFORD in a very ingenious way to determine the action of the pancreatic juice in fat splitting, and the effect of other digestive agents in modifying this action. This part of his paper we shall review next week.

THE ALVARENGA PRIZE for 1891, of the College of Physicians of Philadelphia, has been awarded to Dr. L. Duncan Bulkley, of New York, for his essay on Syphilis Insontium.

THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES.

The second annual session of this Association, recently held in Washington, adopted a permanent constitution and by-laws, and the interesting session was marked by harmony and enthusiasm. Colleges becoming members of the Association must demand of their students, before they receive the M.D. degree, that they have attended three full courses of medical lectures of not less than six months each, no two courses being in the same year. The entrance examination, as prepared by DRS. OSLER and MILLARD, were adopted without change. These require that colleges becoming members of the Association, shall demand of all matriculates an entrance examination equal to the following:

1. By writing legible and correctly a composition of not less than 200 words.

2. By the translation of easy Latin prose.

3. By passing an examination in higher arithmetic or the elements of algebra.

4. By passing an examination in elementary physics.

It is provided, however, that the matriculates or graduates of recognized colleges of literature, science or the arts, or graduates of high schools of the first grade, or of normal schools directly supported by the State, be exempt from this examination. Students are allowed one year to remove a condition in Latin.

As provided at the Nashville meeting in 1890, the provisions of this examination become operative in 1892. In view of the high character of these requirements, one college withdrew from the Association, and a very few delegates that had the credentials of their college were deterred "for the present" from participating in the meeting. The colleges that at present withhold their support from the Association are of two classes: Less than half a dozen of our best institutions having a policy of extreme conservatism, or perhaps provincialism; secondly, about a dozen two course institutions. Perhaps the colleges in the first class would not be benefitted by membership in an Association recently organized for the purpose of elevating the standard of medical education in the United States, but certainly they should give their moral support to the movement for bringing about a better system of medical education in this country. The policy of the Association is to establish and maintain a minimum of requirements, below which no college can go and claim recognition or respectability. The Association has the enthusiastic support of the American Academy of Medicine and of the American Medical Association.

The Association should have the hearty support of all the high-grade schools. A majority of the colleges in the country are now members of the Association, and it is hoped that at the next annual session the membership will be so increased as to include every college in the United States whose teachers really desire a better system and higher grade of medical education in this country.

A MEDICO-LITERARY CURIOSITY FROM CHINA.

A somewhat unusual occurrence has been announced in the translation into Chinese of a semi official English book, by an American medical missionary, which translation has a preface written for it by the prime minister, Prince Li Hung Chang. The book is a quarto reproduction of Squire's edition of the British Pharmacopœia. The prefatory remarks by the powerful Prince are volunteered for the purpose of inducing the physicians and druggists of that country to become better informed as to the latest developments of Western methods of treatment. And the editorial writer of the *Lancet*, July 4, comments upon the singular event by saying that for nearly all that it knows of Western healing, China is indebted to the underpaid and underestimated efforts of medical missionaries. This intelligent Prince, having experienced in his own family the benefits of a missionary physician's practice, in the saving of the life of his own wife after the native doctors had given over her case as incurable, became the instrumentality for the establishment, at Tient-sin, of a hospital of sixty beds, he agreeing to pay the current expenses for a certain number of years. This institution, known as the "Viceroy's Hospital," was built at a cost of $10,000, contributed chiefly by the Chinese themselves. The same issue of the *Lancet* has an item with regard to the amount of surgical work sometimes performed at these missionary hospitals, stating that the brothers Doctors Neve, of Srinagar, Kashmir, did, in the year 1890, about 3,000 operations, of which 759 were capital or severe.

LIFE-SHORTENING OCCUPATIONS.

One of the curious features of modern life is the extent to which the most hazardous trades are overrun by applicants for work. The electric light companies never find any difficulty in obtaining all the linemen they need, notwithstanding the fact that the dangers of that kind of business have been demonstrated times without number. The men who work in factories where wall-paper is made frequently joke one another over the tradition that a man's life, in this trade, is shortened ten years. A similar belief is prevalent in factories where leather papers are made, and among men who have to handle them, and whose lungs are said to become impeded by inhaling the dust arising from those papers. In certain other factories where brass ornaments and fittings are made, the air is laden with very fine brazen particles which are, when inhaled, especially irritating to the lungs. But one of the most singular advertised calls for employés that ever was printed, appeared recently in a Connecticut newspaper, signed by a firm engaged in the business of building towers. It called for applicants only among those who are young, strong and courageous, and closed by saying, "We warn all seekers for this job that it is of the most dangerous nature, and that few men continue in it more than a few years. In fact, it is almost certain death to the workman who follows this occupation." This frankness on the part of the advertiser was commendable, and probably deterred no one who seriously canvassed the taking up of that occupation. There was presumably no dearth of candidates for this life-shortening, since the advertisement was withdrawn after a few days' publication.

IOWA STATE BOARD OF HEALTH.

The Secretary of this Board has made an official deliverance to the effect that habitual inebriety on the part of a medical practitioner shall be regarded as "palpable evidence of incapacity," and should render the drunken delinquent liable to the revocation of his certificate entitling him to practice in the State of Iowa.

AMMONIUM BROMHYDRATE vapors are recommended in lieu of ammonium chloride as an inhalant in some forms of bronchitis and naso-pharyngeal catarrh.

DOMESTIC CORRESPONDENCE.

Antipyrin in Whooping-Cough.

Editor Jour. Amer. Med. Ass'n:—Though antipyrin has been recommended now for some time in the treatment of pertussis, I am surprised to find still a considerable amount of indifference in regard to its employment, either through ignorance of its beneficial effects or fear of its dangers. Like Sonnenberger, I am almost inclined to regard antipyrin as a specific in this affection, though in using the term *specific*, I am aware that the action of the drug is exercised not so much upon the disease itself as upon the nervous system, in quieting the reflex spasmodic cough. It seems to me that the conclusions drawn by Ssemtschenko, after a close and careful experimentation, oblige us to consider the real cause of pertussis a bacillus, probably the bacillus of Afanassjew. This bacillus is specific. It is found in the sputum about the fourth day, or even earlier. It multiplies in the tissues of the body, and increases with the increase in the severity of the disease. With complications like catarrhal pneumonia it is discovered in the sputum in large numbers, and it is a long-recognized fact that this form of pneumonia differs from all the ordinary forms.

Rational medicine would, therefore, seem to indicate the use of antiseptic sprays and inhalations. Carbolic acid has long been thus employed, and I am still a strong advocate of it. But notwithstanding the use of the spray and the usual internal medication, the reflex irritability of the nervous system becomes so increased that the so-called spasmodic stage of the disease is the most distressing to the patient and his attendants. It is also the most dangerous, on account of the asphyxia by which the spasms are accompanied, and the troublesome pulmonary complications which are so prone to occur. It is in this stage, then, that sedatives are demanded above all other forms of medicine, and I know of none to equal antipyrin in allaying the reflex excitability of the nervous system. Of course I continue the carbolic spray through this as well as the earlier and later stages of the disease; but my attention is almost wholly given, at this time, to the relief of the spasmodic coughs which so quickly exhaust the patient's strength, destroy his desire for food, and prevent the necessary sleep at night. Sonnenberger declares that the best results are obtained the sooner the antipyrin is given in the disease; my experience leads me to believe that this early administration of the drug is not necessary in all cases. It is a powerful remedy, and must be employed in full doses to secure the desired effect, therefore I usually reserve it for the paroxysmal stage, and commence giving it only when the child begins to whoop.

During a recent epidemic of this disease in one of our suburban towns, I gave the antipyrin in three cases, aged respectively five, eight and ten years. All of the children, particularly the youngest, possessed a decidedly neurotic type of constitution. The disease was marked, characteristically severe, and passed regularly through the three typical stages. I began with the carbolic spray from the very outset of the trouble, combining with it

the internal administration of some of the older remedies of the sedative and expectorant class. In the second stage the paroxysms became so violent at night, particularly in the case of the youngest child, as to cause both myself and the attendants considerable anxiety. Frequently the spasms would be so severe as to completely arrest respiration for many seconds, and the ensuing cyanosis would be as pronounced as one ever sees it in this disease. With a feeling of complete exhaustion, the little patient would then throw herself on the bed, the eyes watering and the face highly flushed. Finally she would sink into a profound sleep, to be abruptly awakened soon again by a repetition of the same violent paroxysm. This was the state of affairs when I ordered for each of the children two grains of antipyrin three times a day, with an extra dose at bedtime. I furthermore directed the attendant to give the powder more frequently if this did not cause any decided amelioration in the frequency and severity of the paroxysms. To my gratification there was a change almost immediately. The coughing spells diminished to only two or three in the twenty-four hours; the child secured the needed rest at night, and the appetite and general health began to revive. Rarely was it necessary to give the powder oftener than as directed at first. During its administration I have never witnessed the slightest untoward symptoms. Sonnenberger gives it three times a day, in doses of about as many centigrammes (one-sixth of a grain) as the child is months old, or as many decigrammes (one and one-half grains) as it is years of age. While I do not think it would be safe to give the same dosage to all children according to such a fixed rule, I find that generally they bear larger amounts comparatively of the drug than adults. I would urge its careful administration at all times, beginning with the minimum dose, and increasing the same until the desired effect is obtained. Its beneficial action is undoubtedly due to the power which it possesses of depressing the reflex excitability of the nervous centers, and it should be administered, therefore, with a view to the effect rather than the mere size of the dose. I consider the carbolic acid spray, with the internal administration of antipyrin *pro re nata*, the most satisfactory method yet advanced for the treatment of whooping cough. L. HARRISON METTLER.

4228 Greenwood ave., Chicago.

Premature Rupture of Membranes not Followed by Miscarriage.

To the Editor Jour. Am. Med. Assoc'n:—I remember reading in THE JOURNAL some months ago of two cases in which premature rupture of the membranes was not followed by the usual result—a miscarriage. A case having come under my observation recently, I will record it, not for the purpose of going into a discussion of the subject, but as a mere statement of facts.

Mrs. R., multipara. White, 28 years of age; pregnant for fourth time; had, when about five and one-half months advanced, a severe fall—followed by an unmistakable flow of quite a quantity of the amniotic fluid. As no pain followed, the treatment was simply rest in bed for twenty-four hours; after this she felt so well that she resumed her household duties. Pregnancy went to full term and a normal labor terminated in the birth of a strong healthy ten pound child.

Such cases are, I believe, sufficiently uncommon to be of interest to the general practitioner, showing as they do that labor is not the absolutely essential result of rupture of the membranes. Why one woman should have this result and another not is hard to determine. Probably the location of the opening into the amniotic sac is one of the important factors. Another, as I look at it, is the marked difference in the irritability of the uterus in different women. Certain it is some women miscarry on the slightest irritation to any portion of the uterus, while others will go to full term through falls, shakes, railroad accidents—even through the vigorous attempts at abortion performed either by themselves or by some of the human monsters that infest our cities and large towns.

The only treatment that such a case would call for would be rest—perfect rest in bed—and opium in some form to control the muscular action of the uterus.

Pains coming on in spite of this would indicate miscarriage, and then of course the treatment would vary according to the circumstances of the individual case.

JOHN W. JOHNSON, M.D.
Prof. Obst., Col. Phys. and Sur., Boston, Mass.

A Successful Method of Removing Foreign Bodies from the Alimentary Canal.

Editor Jour. Amer. Med. Ass'n:—During the past few months, the writer has been consulted on several occasions by anxious parents whose children have swallowed bits of coin. In each case I have invariably given the parents similar advice. Place the patient upon an exclusive potato diet. The potatoes may be either mashed, baked or boiled.

This method in my hands has been thus far successful. This treatment is adopted, to the exclusion of all others, in the Vienna General Hospital, as I ascertained when visiting that hospital about a year ago. This manner of dealing with patients who have swallowed foreign bodies cannot be too generally known.

J. F. JENKINS, M.D.
Tecumseh, Mich., August 10, 1891.

BOOK REVIEWS.

LECTURES ON TUMORS, FROM A CLINICAL STANDPOINT. By JOHN B. HAMILTON, M.D., LL.D. 12mo, cloth, pp. 138. Detroit: George S. Davis. 1891.

This book, which is intended for the use of students, is the substance of twelve unpublished lectures on tumors, delivered at the Georgetown University in Washington. There are many books descriptive of the pathology of tumors, but few combine the clinical observations necessary to an

understanding of their treatment. This, the little book undertakes to do, and each in the long list of tumors mentioned in the accepted nomenclature, are spoken of briefly, and the symptomatology, diagnosis and treatment given. The book is said by our author to be really the introduction to a larger work on tumors of the regions which, in connection with other well-known writers, he has in preparation. In regard to nomenclature and classification, he adheres to that of the Royal College of Physicians and Surgeons, stating that while that is not at present the ideal classification, yet we must have some standard, and moreover, at the last revision the American Medical Association was consulted, and through the Army Medical Department's representative, the National Board of Health, then in existence, and Dr. C. F. Folsom, of the Harvard Medical College, were also advised with. The day has passed when every man should have his own nomenclature manufactured by himself, and the interest of science demands uniformity in medical and surgical nomenclature, even at some sacrifice. The nomenclature recognized in the book was last revised in 1885 and the author truly says, there is considerable material now ready for the next committee of revision. The student will find here a complete elementary treatise on this obscure subject. As there is a field for the work, there is little doubt of its extensive sale.

PRACTICAL INTESTINAL SURGERY. By FRED B. ROBINSON, B.S., M.D. 12mo. paper, pp. 166. Detroit: George S. Davis. 1891.

The best part of this book, is the dedication, for it is dedicated to Prof. Nicholas Senn.

The author is evidently a much better practitioner than a writer, for the book is painfully filled with ill chosen metaphor, faulty construction and worse logic, while the practical directions for abdominal work are fairly good.

We will make some quotations to justify this sweeping condemnation of the style of the author, if indeed he may be said to have any.

Writing of the alimentary canal, our author thus discourses, on page 5:

"The strong muscular knots in the alimentary tract, though weak from the standpoint of disease, are subject to dilatation and contraction periodically. Their vascular supply is thus fluctuating, and subject to a maximum and minimum blood supply. At such points disease is apt to arise, just as it does in the changeable genital organs and breasts of women. Considerable muscular rings are found heaped together at the pylorus, cœcum and anus. In such periodically active tissue cancer delights to ensconce its wandering cells. The pylorus may be viewed as man's first physiological anus, the ileo-colic valve as his second, and the end of the rectum as his third but mechanical anus."

And again, on page 9: "I have found the cœcum in puppies at the end of the transverse colon; it had not yet descended, nor formed scarcely any descending colon." This is certainly an unusual situation in which to find a puppy. but we have no disposition to dispute our author's statement of facts.

On page 11, our author thus commiserates the uterus.

"Observe the poor vertical uterus around which woman is built, standing, doubtfully, capering on its giddy end, with its heavy responsibility balanced upward. Notice how it careers through a variety of naughty courses, of floods and drought, study the arrogant and defiant positions it assumes on account of man getting on his feet."

No other than the one who wrote the foregoing curiosity could have evolved the following sentence, which may be found on page 26:

"Without specifying names, I have observed death throughout abdominal literature for the past ten years in considerable numbers."

The reader will doubtless be greatly edified if he should try to analyze the sentence just quoted.

There is some good in the book, but it is generally couched in such bad form as to be of little value. We had rather praise than censure, but our duty as reviewer, and as well the true interest of American medical literature, require that such crude book-writing as is shown here, should be held up to view, that persons inclined to authorship, may refrain from encumbering our shelves with such trash, and unless our author rewrites his book, he will have another "death in abdominal literature" to "observe," quite near home.

A CLINICAL TEXT-BOOK OF MEDICAL DIAGNOSIS, for physicians and students, based on the most recent methods of examination, by OSWALD VIERORDT, M.D., Professor of Medicine at the University of Heidelberg. Authorized translation from the second improved and enlarged edition, with additions by Francis H. Stewart, A.M., M.D., of Brooklyn, with one hundred and seventy-eight illustrations. Philadelphia: W. B. Saunders.

This first English translation of so excellent a work finds itself a welcome arrival. The original found fewer readers in this country than it should have had, for reasons alike obvious and to be regretted. The translator has, however, brought its benefits within the reach of many who will appreciate his book, as well as the authors, and will deem as of secondary importance the rather numerous errata, which detract from the pleasure of the reader.

The division of the work into three parts—consisting of eight chapters and an appendix, is a convenient one.

Part I, embracing chapters one and two, is devoted to the general preliminary examination, systematically conducted and to be commended. This is supplemented by the translator in a note upon keeping records of cases, and a form for recording the results of a medical examination.

Part II, consisting of chapter three, is devoted to critical general examination of the individual patient. It is methodical and thorough, and like part one will be found to be specially serviceable to young physicians, though not without interest or usefulness to all.

Part III embraces chapters four, five, six, seven and eight. Under chapter four, examination of the respiratory apparatus is conducted in a very thorough manner.

Under chapter five, examination of the circulatory apparatus, is so subdivided and followed in detail as not only to be useful but to sustain interest in conducting the work of the examination.

Chapter six deals with the complication of digestion, examination of the digestive apparatus, —and is conducted in such manner as must result in convincing us of how much, and how little, we know definitely and reliably of the chemistry and physiology of digestion—salivary, gastric and intestinal—however well convinced we may be of the evils incident to its defective work, and the difficulty, as well as the importance, of remedying it. Chapter seven is devoted to examination of the nervous system. This is conducted in accordance with the scientific methods of the most advanced thought in the present state of neurology, and in following them, whilst advising what can be accomplished in elucidating many of the mysteries of the nervous system, one is forcibly impressed with what evidently yet remains unknown on this subject.

The appendix embraces some matters of general interest, especially what relates to bacteria, which come under consideration in the diagnosis of internal diseases.

The numerous illustrations throughout the work are generally above the average. Some of them are more than ordinarily successful delineations, and there are some good specimens of staining of bacteria. The index is full and satisfactory. The mechanical work throughout the book is good.

In all respects it is a desirable addition to a physician's library.

MANUAL OF CLINICAL DIAGNOSIS. By ALBERT ABRAMS, M.D. San Francisco: The Bancroft Company.

The author says in the preface of this small work that he makes no special claim to originality, that he has only "gathered a posie of other men's flowers, and nothing but the thread that binds them is mine own." While the writer thus modestly sets forth his effort, we must remind him that a good text-book needs nothing original. We do not go to our school-books for critical discussions of mooted points, or for the detailed description of isolated experiments. A text-book should accurately represent the best and most approved opinion of the most advanced scholars in the particular branch of which it treats. It should be well arranged, with a good index, expressed in concise language, and free from controversial matter. An examination of the volume upon these lines shows that the writer has produced a compact and useful manual. If we would pass any criticism upon this book, it must be upon the score of what is generally a "good fault" in a text-book. The writer, in his efforts to be brief and concise, has to some extent sacrificed smoothness of diction; still, this is so much better than verbosity, that we freely forgive him.

MISCELLANY.

TRI-STATE MEDICAL ASSOCIATION.—The third annual meeting of the Tri State Medical Association will convene in Turner Hall, Chattanooga, Tenn., Tuesday, October 27, 1891, and continue in session three days. Indications are that it will be one of the largest medical meetings ever held in the South. Representative physicians from all sections will be present.

All who desire to read papers should send title to the Secretary of the Association before September 1. In due time a circular will be issued, giving a complete list of all papers and names of exhibitors who apply for space before October 1.

President—Robert Battey, M.D., Rome, Ga.; Secretary—Frank Trester Smith, M. D., Chattanooga, Tenn.; Secretary of Executive Committee—W. L. Gahagan, Chattanooga, Tenn., P. O. Box 542.

MISSOURI VALLEY MEDICAL SOCIETY.—The fourth annual meeting of the Medical Society of the Missouri Valley will be held at Council Bluffs, Ia., September 17 and 18. The Society has a membership of over 300. None but men of known professional standing are admitted as members. The membership extends along the Missouri Valley from Yankton, S. Dak., to St. Louis, Mo. Physicians residing in South Dakota, Nebraska, Iowa, Kansas, and Missouri, constitute the membership.

Official List of Changes in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from August 1, 1891, to August 7, 1891.

First Lieut. Alfred D. Bradley, Asst. Surgeon U. S. A., granted leave of absence for thirty days.

Asst. Surgeon William L. Kneedler, U. S. A., leave of absence granted is extended one month.

Official List of Changes in the Medical Corps of the U. S. Navy, for the Week Ending August 8, 1891.

Surgeon R. A. Marmion, detached from Navy Yard, Norfolk, and to the Navy Yard, Boston.

Surgeon G. F. Winslow, detached from Marine Rendezvous, Boston, and to the Navy Yard, Norfolk, Va.

Surgeon J. B. Parker, detached from Navy Yard, Boston, and placed on waiting orders.

Asst. Surgeon F. G. Braithwaite, ordered to receiving ship "Wabash," at Navy Yard, Boston.

Asst. Surgeon J. B. Uric, detached from receiving ship "Wabash," and to the Marine Rendezvous, Boston.

P. A. Surgeon F. J. B. Cordeiro, detached from Naval Hospital, Chelsea, Mass., and granted two months' leave of absence.

P. A. Surgeon G. McC. Pickerell, from hospital, New York, to hospital, Chelsea.